CPEx GX-333-X

ISA Single-Board Computers with Embedded 333MHz Geode GX-2 CPU

CPEN GX-333-X: VGA, Audio, LAN & USB
CPEZ GX-333-X: VGA, Audio, LAN, SATA & USB

RoHS compliant

USER'S MANUAL

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Introduction

Product Overview

General Information

The CPEx GX-333-X is a highly-integrated single board computer specifically optimized for a variety of applications featuring low power consumption and is suitable for building combined force in multi-ISA-slot installations. This user manual was written for the CyberResearch CPEx GX-333-X CPU card series, and this series covers two CPU cards: the CPEN GX-333-X and the CPEZ GX-333-X. The CPU cards are identical with the exception of two SATA ports on the CPEZ card. Throughout this manual both cards are referred to as the CPEx GX-333-X unless otherwise indicated.

The CPEx GX-333-X is particularly suitable for fan-less applications. The CPEx GX-333-X supports a full range of functionality for an AT/ATX-compatible industrial computer in a space-saving half-size card profile. With the soldered 266MHz 128/256MB SDRAM memory, the SBC is ready to run; and if necessary, a large buffer of the size up to 1GB can be implemented. The CPEx GX-333-X is equipped with a low-power consumption and high performance AMD Geode GX466 processor on board. The CPEx GX-333-X supports complete connectivity to peripheral devices and connections through the following: USB 2.0, 10/100BaseT, 24-bit TTL LCD, VGA display, RS-232/422/485 serial ports, parallel, IrDA, SATA disk drives (CPEZ only), audio output, and programmable Digital I/O pins.
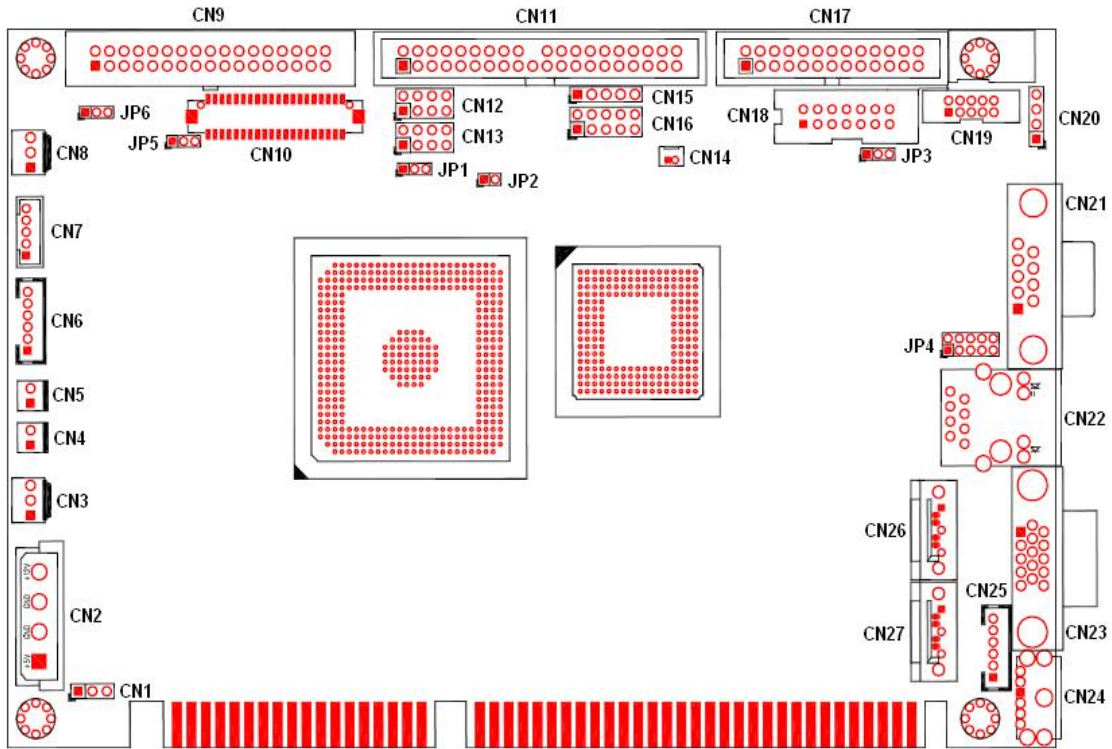
Figure 1-1   Version 1.10 CPEZ GX-333-X Board Layout
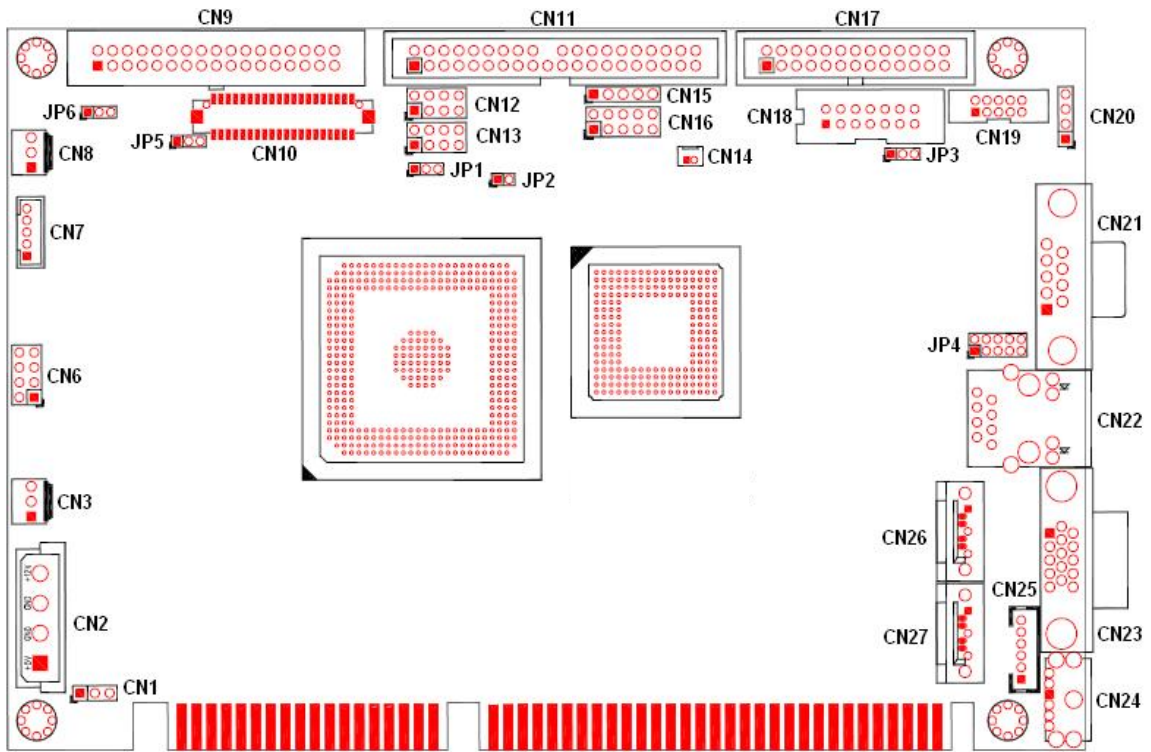
Figure 1-2   Version 1.11 CPEZ GX-333-X Board Layout

Connectivity

The CPEx GX-333-X provides the following interface connections:

Label	Function
CN1	Supplementary "–VCC" power connector
CN2	4P primary power connector
CN3	3-pin PS_ON signal connector
CN4	2-pin power button switch connector (board version 1.10 only)
CN5	2-pin reset button switch connector (board version 1.10 only)
CN6	6-pin LED connector (to chassis LEDs) (board version 1.10)
CN6	6-pin LED connector (to chassis LEDs) (board version 1.11)
CN7	5-pin LCD inverter control-
CN8	3-pin CPU fan header
CN9	34-pin Floppy connector
CN10	24-bit TTL LCD connector (DF13-40P-1.25V)
CN11	40-pin Primary IDE connector (40-pin 2.54mm)
CN12	8-pin internal USB1 2.0 connector (2 USB ports via an adapter cable)
CN13	8-pin internal USB2 2.0 connector (2 USB ports via an adapter cable)
CN14	2-pin battery connector to an onboard Lithium coin cell battery
CN15	5-pin IrDA port pin header
CN16	10-pin digital I/O connector
CN17	26-pin parallel port connector
CN18	14-pin internal serial port (COM2/3) pin header
CN19	10-pin audio connector
CN20	4-pin audio CD_IN pin header
CN21	D-SUB 9 external serial port (COM1)
CN22	RJ-45 Ethernet port
CN23	D-SUB 15-pin VGA connector
CN24	PS/2 keyboard/mouse connector
CN25	6-pin pin header supplementary keyboard/mouse connector (an adapter module is required)
CN26	Serial ATA connector
CN27	Serial ATA connector
CN28	Compact Flash Storage Card socket (on the soldering side)
CN29	SDRAM DDR SO-DIMM socket System supports up to 1GB memory size including the 256MB soldered memory, which must be deducted from the total when adding a memory module to this socket.

The CPEx GX-333-X is built around an AMD Geode™ chipset which features highest performance per watt, an embedded graphics controller, and full set of functionality through the companion Geode CS5536 Southbridge. The CPEx GX-333-X enables simultaneous dual-display operations by the 32-bit processing power, the 6GB/s bandwidth GeodeLink internal links, and the integrated FPUs operating enhanced Intel MMX and 3DNow! technologies.

The built-in graphics controller supports either a CRT or a 24-bit TTL LCD display. It offers the resolutions of LCD screen up to 1600 x 1200 x 16 BPP and 1280 x 1024 x 24BPP, with 24-bit TTL flat panel interface. The CPEx GX-333-X high efficiency design enables its use in a variety of multimedia applications combining the powerful Geode x86 engine, application-specific system-level peripherals, multi-input video processor, video input/output ports, core logic, and a Super I/O block. In addition, the architecture features advanced display interface support for audio, AC'97, and AMC97.

Other distinguished features include: USB interface, power management ACPI 1.0 and APM compliance, long-term support, and built-in OS integration.

With a specially designed aluminum heatsink, this board can operate without a cooling fan at temperatures up to 60° C (140°F) and typically consumes low power watts while delivering high performance and supporting numerous peripherals.

CPEx GX-333-X Board Overview
Component Side

CPEx GX-333-X Board Overview - Component Side

Soldering Side
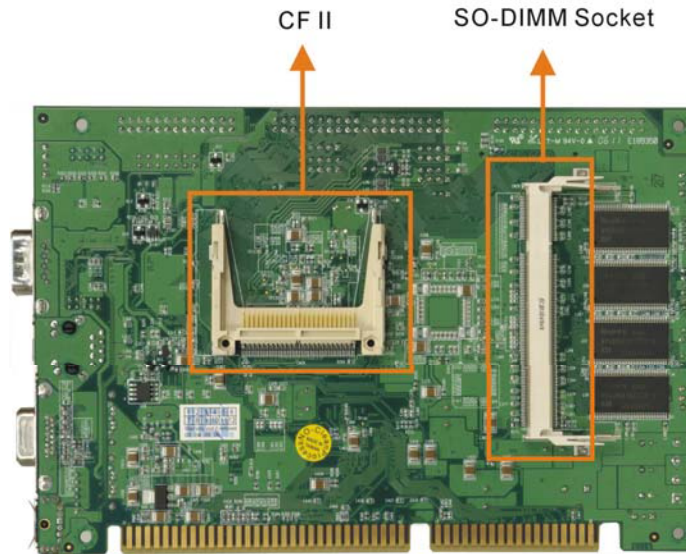
Figure 1-**3   CPEx GX-333-X Board Overview - Solder Side**

Technical Specifications

Table 1-1 Technical Specifications

CPU	● Embedded AMD Geode GX466@0.9W processor at 300MHz frequency
Chipset	● Geode CS5536D as Southbridge
Memory	● One 64-bit DDR 200-pin SODIMM socket that supports SDRAM memory up to 512MB (1GB minus the onboard 256) with 266MHz speed
Display Controller	● Integrated graphics controller ● Integrated video DACs and integrated TFT interface for flexible output options: CRT or TFT (bond-out option or strap-selectable depending on package) ● 24-bit TTL/TFT LCD flat panel interface
PCI Interface	● PCI 2.2 compliant, 32-bit 3.3V PCI interface w/ 5V tolerant inputs ● Write gathering and write posting of inbound write requests ● Supports fast back-to-back transactions
10/100Mbps Realtek8100C Ethernet Controller	● IEEE 802.3 10/100M Base-T standard auto-sensing interface to 10Mbps or 100Mbps networks through an onboard RJ-45 connector.
BIOS	● AMI 256KB Flash memory
Compatible Backplane	● Pure-ISA type
Compact Flash Disk	● Runs in true IDE mode that simulates the operation of a physical IDE hard drive. It can be used with a passive adapter in a Type II socket in DMA mode.
IDE Interface	● Supports one ATA33/66/100 IDE channel with the connectivity to one hard disk drive (The slave is reserved for the CFII card; or that you may configure the BIOS setting to make use of a second hard drive)
FDD Interface	● Supports one floppy disk drive channel for 3.5" (720KB, 1.44MB, or 2.8MB) by a 34-pin connector cable.

Serial Ports	● Two RS-232 ports with 16C550 UART (or compatible) with 16-byte FIFO buffer. COM2 can support RS-422/485 through jumper setting.
Parallel Port	● One parallel port supports SPP/EPP/ECP mode
Audio Connector	● One 2x5 pin header supports AC'97 2.3 Line-in, Line-out, and Mic-in signals to external audio devices.
USB Interface	● Four (4) USB ports through internal pin headers; USB 2.0 compliant.
Watchdog Timer	● Can be Set to 1 to 255 seconds period. Reset or NMI will be generated when CPU does not periodically trigger the timer.
E2Key	● A non-volatile 1Kbit EEPROM is provided to retain application critical read/write data.
Power Consumption	● +5V,+/-12V and 5VSB ● +5V: 2.58A typical, ● +5V: 2.75A typical,
Hardware Monitor	● Winbond 83627EHF
IrDA Port	● Supports Serial Infrared (SIR) and Amplitude Shift Keyed IR (ASKIR) interface
Operating Temperature	● 0° to 60°C
Form Factors	● 185mm(L) x 127.6mm(W)
AC '97 interface	● Provides 10 Pin Audio header. ● 16-bit, full-duplex AC'97 Rev. 2.3 compatible six-channel audio CODEC designed for PC multimedia systems, including host/soft audio and AMR/CNR-based designs. ■ Meets performance requirements for audio on PC99/2001 systems ■ Meets Microsoft WHQL/WLP 2.0 audio requirements ■ 16-bit Stereo full-duplex CODEC with 48KHz sampling rate ■ Compliant with AC'97 Rev 2.3 specifications ➢ Front-Out, Surround-Out, MIC-In and LINE-In Jack Sensing ➢ 14.318MHz -> 24.576MHz PLL to eliminate crystal ➢ 12.288MHz BITCLK input ➢ Integrated PCBEEP generator to save buzzer ➢ Interrupt capability

Packing List
1 x CPEx GX-333-X single board computer
1 x Mini jumper pack
1 x IDE flat cable 40p/40p/40p
2 x SATA cable (CPEZ only)
1 x SATA power cable (CPEZ only)
1 x Keyboard / PS2 mouse cable
1 x USB cable
1 x Audio cable
1 x Utility CD
1 x QIG (Quick Installation Guide)

System Monitoring
The CPEx GX-333-X is capable of self-monitoring various aspects of its operating status:

- Vcore voltage, +3.3V, +5V, and +2.5V

- RPM of cooling fans (not implemented with this model)

- CPU temperatures (by the corresponding embedded sensors

Functional Description

This chapter provides a functional description of the CPEx GX-333-X half-size card designed for the integration into a compact size chassis. This chapter includes information about main processors, interface connectors, implementation options, and signal description.

CPU, Memory, and VIA Chipsets

CPU

The CPEx GX-333-X comes with a soldered low power AMD Geode GX-466 processor. The AMD Geode design integrates high-performance graphics controller, VGA and Flat Panel display interfaces, with the burst and concurrent GeodeLink pipelining capability for fast data distribution among CPU, DRAM, and PCI buses. CPU and the major functionalities are provided in a single processor package. The CPU is accompanied by the Geode CS5536AD Southbridge featuring full-featured interfaces with integrated UltraDMA-33/66/100 IDE, USB, and a complete power management feature set. The CS5536AD also provides hardware monitoring and super I/O functions (floppy disk drive and serial/parallel ports).

The CPU is passively cooled over a heatsink made in aluminum alloy and is ideal for small form factor computing applications with its low power consumption and minimum heat dissipation.

Shown below are some of the key features of the AMD Geode GX processor:

- 32-bit low-power x86 processor with MMX and 3DNow! technology extensions.
- Processor frequency up to 300MHz.
- 32KB L1 cache, 16KB instruction and 16KB data.
- Integrated thermal diode.
- 64-bit DDR memory controller.
- Integrated FPU.
- PCI 66MHz bus:
  - Industry standard PCI 2.2 specification compliant
  - Write gathering and write posting of inbound write requests
  - Supports fast back-to-back transactions
- Optimized Unified Memory Architecture (UMA) with patented compression technology.
- High-resolution CRT and TFT outputs (simultaneous operation)

■ Integrated display controller:

   - Integrated video DACs and integrated TFT interface for flexible output options: CRT or TFT (bond-out option or strap selectable depending on package)

Memory

The CPEx GX-333-X provides one (1) 200-pin DDR SDRAM SODIMM socket without ECC support for building a buffer size up to a theoretical number of 1GB. The memory is automatically identified. The memory interface supports DDR SODIMM modules at up to 266MHz frequency.

VGA/LCD Interface

Chipset: AMD Geode GX- series CPU with integrated Graphics Accelerator.

Interface: CRT and TFT outputs (select either of the display type), Alpha BLT, Integrated dot clock PLL.

Audio

The AC'97 capabilities are provided by a Realtek ALC203 chip supporting digital audio outputs. The onboard ALC203 is a 20-bit DAC and 18-bit ADC supporting full-duplex AC'97 2.3 compatible stereo audio CODEC for multimedia, including host/soft audio, and AMR/CNR based designs. It provides two pairs of stereo outputs with independent volume controls, a mono output, multiple stereo and mono inputs, along with flexible mixing, gain, and mute functions.

Block Diagram
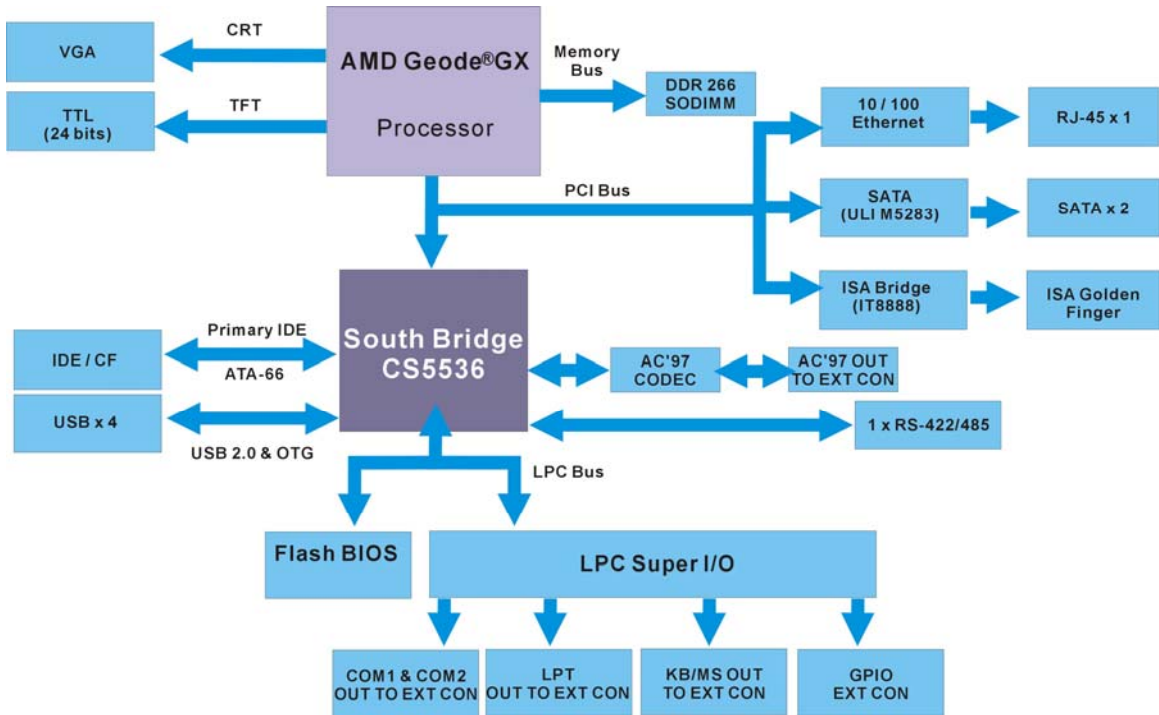
Figure 2-4   **System Block Diagram**

Important Features

Major functionalities provided by the CPEx GX-333-X are listed below:

Table 2-2   Important Features

■ RoHS compliance.
■ AMD long term support product; embedded AMD processor.
■ Pure ISA golden finger ■ CF II socket (CF card behaves as an IDE boot device if no HDD is applied). ■ Embedded Graphics Controller with the support for VGA-interface and TFT displays (either-or connection). Supports one 24-bit TFT and with up to 1600 x 1200 resolutions
■ Aluminum alloy heatsink for optimum heat dissipation in fan-less installations. ■ System Memory: one 200-pin SODIMM socket for 64-bit, 266MHz memory modules ranging from 64MB to 512MB in size.
■ 16KB I/ 16KB D L1 cache for fast I/O processing.
■ Two serial ports, COM1 for RS-232, COM2/3 for RS-232/422/485
■ USB compliant with the USB rev. 2.0 standard ■ System Chipset: AMD Geode GX-466 + Geode CS5536AD Southbridge ■ Hardware Monitor: built-in to monitor CPU Vcore, VCC, CPU/System fan speed, and temperature detection functionalities.
■ Independent DMA audio engines
■ Realtek® 8100C: Supports 10/100BaseT Ethernet, IEEE 802.3U compatible full duplex flow control ■ Audio: ALC203 AC"97 2.3 CODEC
■ IrDA support: 115kbps, IrDA 1.1 compliant
■ Watchdog Timer: Software programmable 1-255seconds by W83627EHF ■ Operating temperature: 0 to 60°C
■ Humidity: operating, 0 to 95% relative humidity
■ Power consumption: +5V @1.2A (AMD Geode LX-800with DDR400 1GB memory)

External Interfaces

For the locations of external interfaces, please refer to the diagram below:
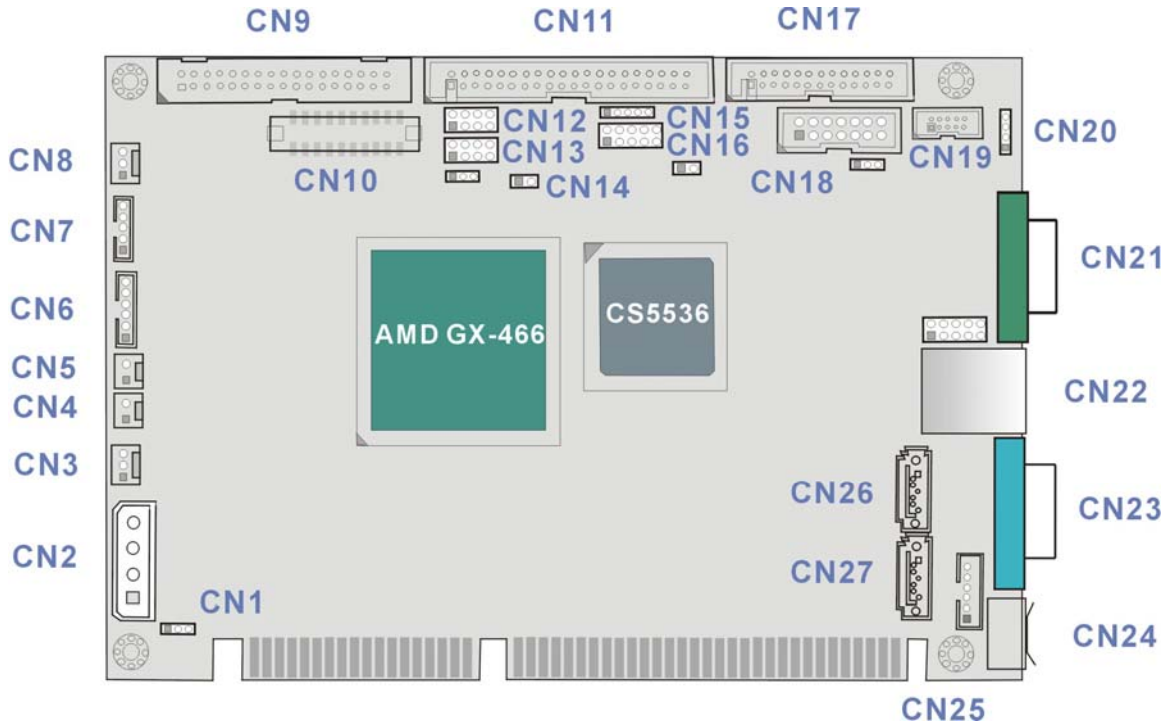
Figure 2-5 Version 1.10 **External Interfaces (Component Side)**
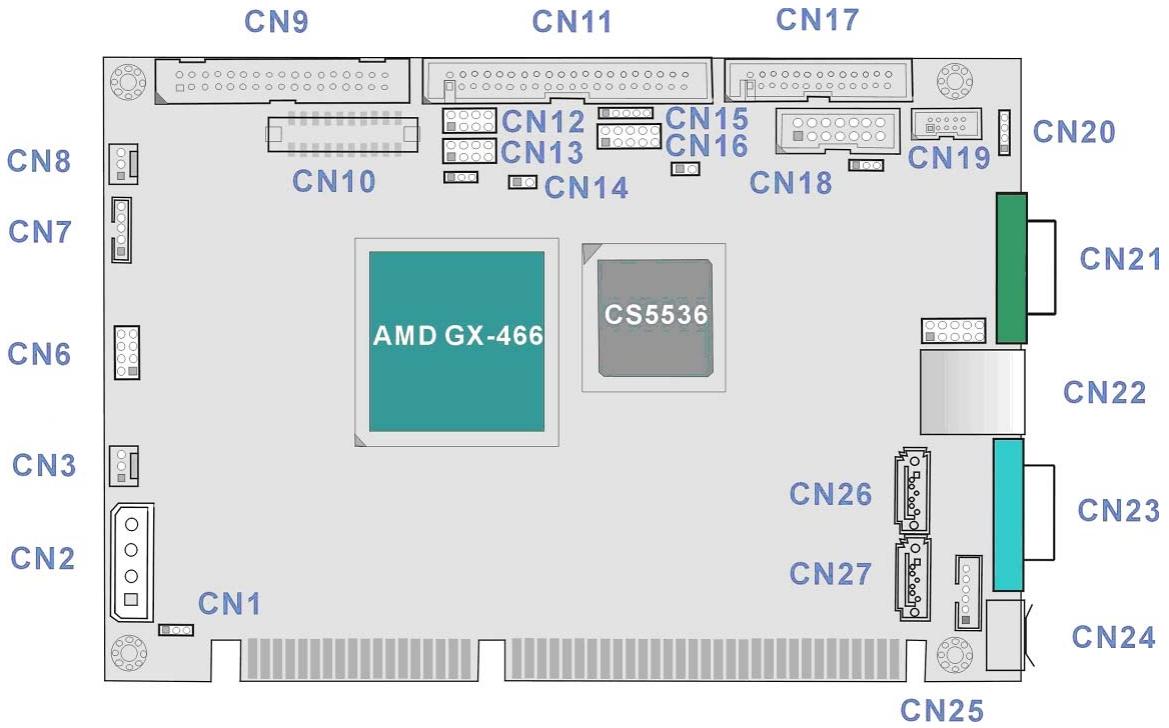
Figure 2-6 Version 1.11 **External Interfaces (Component Side)**
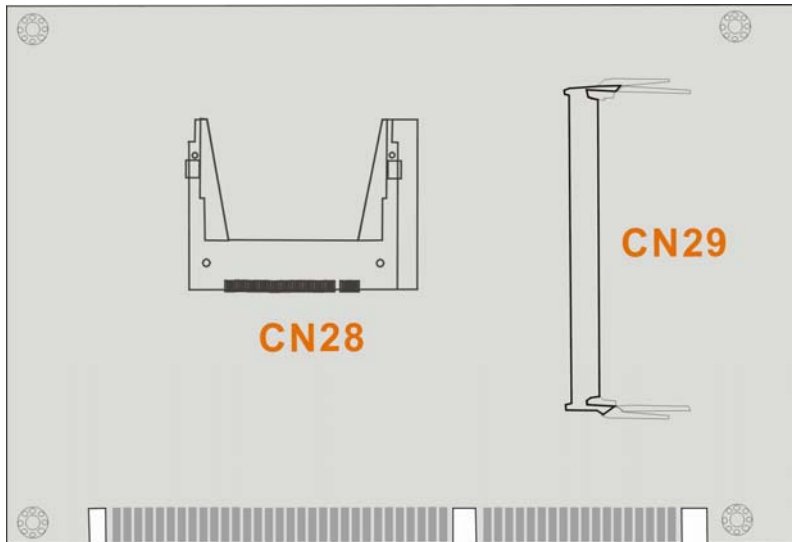
Figure 2-7 External Interfaces (Soldering Side)

NOTE:

1. The configuration options through jumper settings will be discussed in *Chapter 3: Installation.*
2. On the solder side, there are a CFII card socket and a 200-pin SO-DIMM socket.

Shown below is a diagram indicating the locations of configuration jumpers.
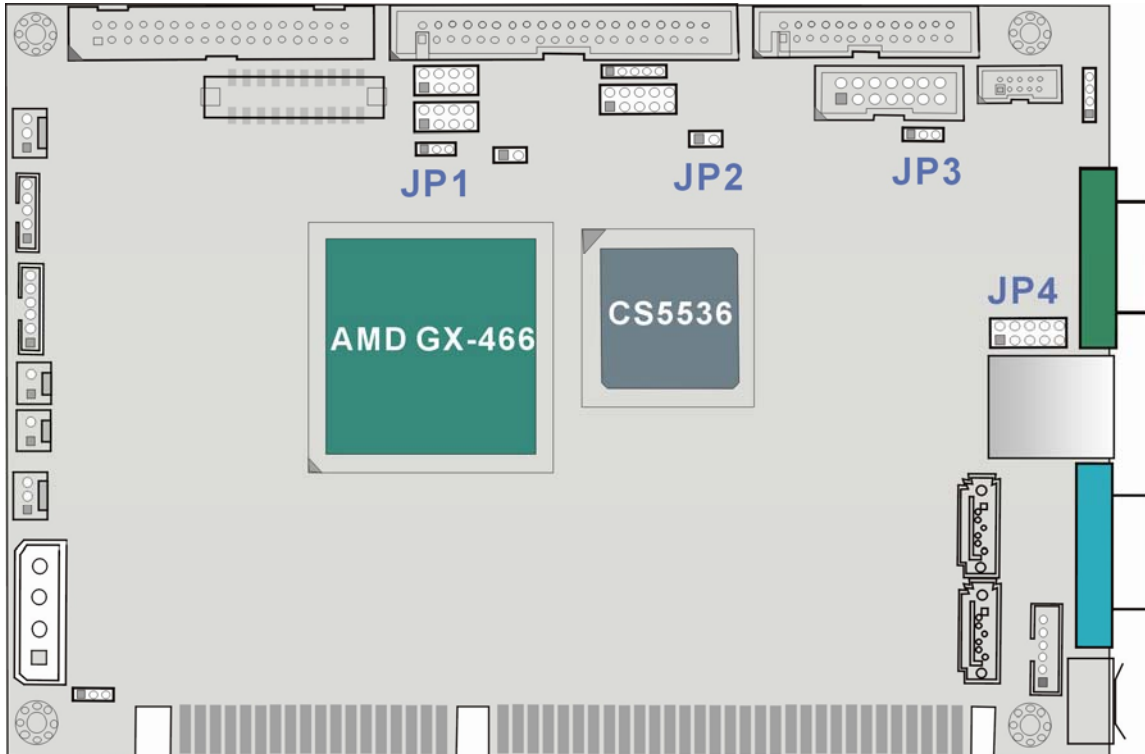
Figure 2-8 Board Version 1.10 and Version 1.11 **Locations of Configuration Jumpers**

NOTE:

1. Only configuration jumpers are shown in the diagram above.
2. For more configuration details on jumper settings, please refer to *Chapter 3 Installation*.

Table 2-3 Interface Connectors

Label	Function
CN1	Supplementary "–VCC" power connector
CN2	4P primary power connector
CN3	3-pin PS_ON and 5VSB signal connector with 5V standby
CN4	2-pin power button switch connector (board version 1.10 only)
CN5	2-pin reset button switch connector (board version 1.10 only)
CN6	6-pin LED connector (to chassis LEDs) (board version 1.10)
CN6	6-pin LED connector (to chassis LEDs) (board version 1.11)
CN7	5-pin LCD inverter control-
CN8	3-pin CPU fan header
CN9	34-pin Floppy connector
CN10	24-bit TTL LCD connector (DF13-40P-1.25V)
CN11	40-pin Primary IDE connector (40-pin 2.54mm)
CN12	8-pin internal USB1 2.0 connector (2 USB ports via an adapter cable)
CN13	8-pin internal USB2 2.0 connector (2 USB ports via an adapter cable)
CN14	2-pin connector to an onboard Lithium coin cell battery
CN15	5-pin IrDA port pin header
CN16	10-pin digital I/O connector
CN17	26-pin parallel port connector
CN18	14-pin internal serial port (COM2/3) pin header
CN19	10-pin audio connector
CN20	4-pin audio CD_IN pin header
CN21	D-SUB 9 external serial port (COM1)
CN22	RJ-45 Ethernet port
CN23	D-SUB 15-pin VGA connector
CN24	PS/2 keyboard/mouse connector
CN25	6-pin pin header keyboard/mouse connector (an adapter module is required)
CN26	Serial ATA connector
CN27	Serial ATA connector
CN28	Compact Flash Storage Card socket (on the soldering side)
CN29	SDRAM DDR SO-DIMM socket (on the soldering side) System supports up to 1GB memory size including the 256MB soldered memory, which must be deducted from the total when adding a memory module to this socket.

Internal Connectors

1. CN1: -5V & -12V Supplementary Power Connector

This connector provides a –5V and a-12V input pins. These two minus voltage pins

connect to the identical pins on ISA bus golden fingers.

Table 2-4   CN1: -5V & -12V Connector Pinouts

PIN	DESCRIPTION
1	-5V
2	GND
3	-12V

Figure 2-9 CN1 –5V & -12V

2. CN2: Power 4P Connector

The CPEx GX-333-X is equipped with an onboard external power connector, CN2. You can connect a 4P power plug directly to CN2 if you use AT power supply.

Table 2-5   CN2: Power 4P Connector

PIN	DESCRIPTION
1	+5V
2	GND
3	GND
4	+12V

Figure 2-10   CN2 4P Power
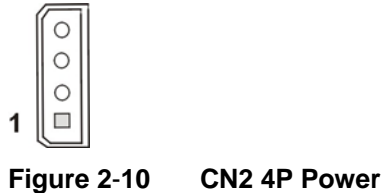
3. CN3: SBVCC ATX Power Feature Connector

The SBVCC connector can support an advanced soft power switch function providing one PS_ON and one 5V standby. If an ATX power supply is used, connect an ATX-to-4P adapter power cable between the SBVCC connector and ATX power source. Also connect a power on/off switch to the ATX ON/OFF switch. Note that your ATX power supply should provide a

10mA load on the 5V source standby lead for this function to take effect. If the LAN Wake-on

function should be applied, a minimum of 650mA should be supplied.

Table 2-6   CN3 SBVCC: ATX Power Feature Pinouts

PIN	DESCRIPTION
1	GND
2	PS_ON
3	5VSB
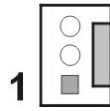
Figure 2-11   CN3 - SBVCC ATX Power Feature

4. CN4: Power Button Connector (board version 1.10 only)

JST HEADER 1x2 2.54mm

This connector is used to connect a chassis power On/Off button using an adapter cable. This connector is closely related to JP2

configuration. The use of this connector is briefed as follows:

1. Using **ATX** power: CN4 connects to a power switch which functions as a soft-power-on switch managed by

 BIOS power-on setting, and the JP2 jumper should be left open.

2. Using **AT** power: The pins on JP2 are shunted by a jumper cap. The default configuration of JP2 is shunted.

Table 2-7   CN4 Power ON/OFF Button Connector Pinouts

PIN	DESCRIPTION
1	AUTO_SW#
2	PWR_BTN#

Figure 2-12   CN4 Power ON/OFF Button Connector

5. CN5: Reset Button Connector (board version 1.10 only)

Table 2-8   CN5 Reset Button Connector Pinouts

PIN	DESCRIPTION
1	SYS_RST#
2	GND

Figure 2-13   CN5 Reset Button Connector

6. CN6: Chassis LED Connector (board version 1.10)

This connector comes as a 1x6 pin Wafer 2mm connector. This connector facilitates the connection from SBC to chassis LEDs through the chassis LED controller board.

Table 2-9   CN6 Chassis LED Connector Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	+5V	2	GND
3	LED+ (VCC)	4	LED- (GND)
5	IDE_LED+ (VCC)	6	IDE_LED-
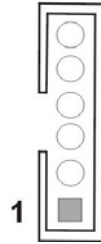
Figure 2-14 CN6 - Chassis LED Connector

7. CN6: PWR & RST Button and Indicators Panel (board version 1.11)

The Connector includes a Power Button & Reset Button, a Power LED and IDE LED.

Table 2-10 CN6 PWR & RST Button and Indicators Panel Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	PWRBTN	2	+5V
3	GROUND	4	GROUND
5	+5V	6	RESET
7	HDDLED-	8	GROUND
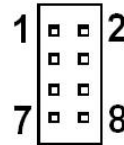
Figure 2-15 CN6 - PWR & RST Button and Indicators Panel Connector

8. CN7: LCD Panel Inverter Backlight Control Connector

This connector comes as a 1x5 pin Wafer 2mm connector.

Table 2-11 CN7 Inverter Backlight Control Connector Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	LCD_ADJ	2	GND1
3	+12V	4	GND2
5	BL_EN		-
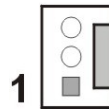
Figure 2-16 CN7 Inverter Backlight Control

9. CN8: Fan Connector

CN8 provides access to a +5V power source and a sensor pin for reporting fan rotation speed.

Table 2-12 CN8 Fan Connector

PIN	DESCRIPTION
1	GND
2	+5V
3	FAN_SPEED
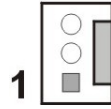
Figure 2-17 CN8 Fan Connector

10. CN9: Floppy Connector

A 34-pin floppy connector cable is required for connecting to the optional floppy port. You can connect two (2) 3.5"(1.44 MB) disk drives through this port.

Table 2-13 CN9: Optional Floppy Connector

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND1	2	DRVDEN0
3	GND2	4	N/C
5	GND3	6	N/C
7	GND4	8	INDEX#
9	GND5	10	MOT0#
11	GND6	12	N/C
13	GND7	14	DSA#
15	GND8	16	N/C
17	GND9	18	DIR#
19	GND10	20	STEP#
21	GND11	22	WDATA#
23	GND12	24	WGATE#
25	GND13	26	TRK0#
27	GND14	28	WP#
29	N/C	30	RDATA#
31	GND16	32	HDSEL#

Figure 2-18 CN9 Floppy Port

33	N/C	34	DSKCHG#

11. CN10: Flat Panel (TTL/TFT) Display Connector

TFT LCD (24-bit one channel; DF13-40DP-1.25V)

Table 2-14 CN10 – TTL LCD Flat Panel Connector Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
2	LVD_VCC5	1	LVD_VCC5
4	GND	3	GND
6	LVD_VCC3	5	LVD_VCC3
8	GND	7	N/C
10	TFT_B1	9	TFT_B0
12	TFT_B3	11	TFT_B2
14	TFT_B5	13	TFT_B4
16	**TFT_B7**	15	TFT_B6
18	TFT_G1	17	TFT_G0
20	TFT_G3	19	TFT_G2
22	TFT_G5	21	TFT_G4
24	TFT_G7	23	TFT_G6
26	TFT_R1	25	TFT_R0
28	TFT_R3	27	TFT_R2
30	TFT_R5	29	TFT_R4
32	TFT_R7	31	TFT_R6
34	GND	33	GND
36	VSYNC	35	FPCLK
38	HSYNC	37	DISPEN
40	LCD_EN	39	N/C
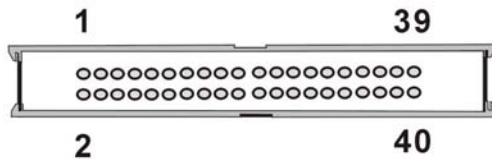
Figure 2-19   CN10 TTL LCD Panel Display Connector

12. CN11: IDE Connector

One IDE connector can connect to one (1) IDE cable, and the single IDE cable can then connect to two IDE devices.

An optional IDE adapter cable from CyberResearch is available..

Table 2-15 CN11 IDE Connector Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	PIDE_RST#	2	GND
3	PIDE_D7	4	PIDE_D8
5	PIDE_D6	6	PIDE_D9
7	PIDE_D5	8	PIDE_D10
9	PIDE_D4	10	PIDE_D11
11	PIDE_D3	12	PIDE_D12
13	PIDE_D2	14	PIDE_D13
15	PIDE_D1	16	PIDE_D14
17	PIDE_D0	18	PIDE_D15
19	GND	20	N/C
21	PIDE_DRQ	22	GND
23	PIDE_IOW#	24	GND
25	PIDE_IOR#	26	GND
27	PIDE_RDY	28	CSEL
29	PIDE_ACK#	30	GND
31	PIDE_INTRQ	32	N/C
33	PIDE_A1	34	IDE_CABLEID
35	PIDE_A0	36	PIDE_A2
37	PIDE_CS#0	38	PIDE_CS#1
39	PDASP#	40	GND
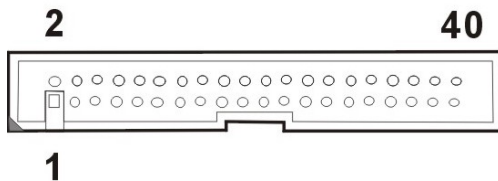
Figure 2-20   IDE Connector

13. CN12 & CN13: Internal USB Header (Two Ports)

USB: 2x4 8-pin headers.

This header provides the connectivity to additional USB devices through an adapter cable. Various adapters may come with USB ports on a slot bracket or ports that can be attached to D-SUB openings on a chassis.

Table 2-16 CN12 & CN13 USB Port Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	+5V	2	USB_GND
3	D1F-	4	**USBDT3P**
5	USBDT2P	6	USBDT3N
7	GND	8	+5V

2   **8**
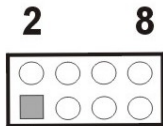
1

Figure 2-21   CN12 and CN13 USB Combo Header

14. CN14: Coin Cell Battery Connector

Notices on Battery:

✓ This 2-pin header connects to an externally mounted 3V, Lithium, cell coin battery (VARTA CR2032). The life expectancy of the battery is approximately 7 years. Depending on the working condition, the life expectancy may be shorter.

✓ Replacing a battery is not a user operation.

✓ If the battery starts to weaken and loses voltage, contact CyberResearch for a replacement module. Dispose of the used battery properly. You may contact your local waste disposal agency for disposal instructions. Do not dispose of a used battery with normal household waste.

⚠ WARNING!

1. Keep a used battery away from children.

2. Danger of explosion if the battery is incorrectly replaced. Only a certified module from CYBERRESEARCH can be used as a replacement.

3. Do not expose the battery to excessive heat or fire.

4. If the battery shows signs of leakage, contact CyberResearch immediately.

Table 2-17 CN14 Coin Cell Battery Connector Pinouts

PIN	DESCRIPTION
1	+3V
2	GND

Figure 2-22   CN14 Battery Connector

15. CN15: IrDA Port

This pin header allows you to connect external Infrared devices through an adapter cable.

The IrDA port supports either a Serial Infrared (SIR) or an Amplitude Shift Keyed IR(ASKIR) interface. The header comes as a 1x5 pin 2.54mm pin header.

Table 2-18 CN15 IrDA Interface Port Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	+5V	2	N/C
3	IR-RX	4	GROUND
5	IR-TX		

Figure 2-23 CN15 IrDA Interface Header

16. CN16: GPIO Connector

This connector provides general purpose I/Os managed by a Winbond W83627EHF LPC I/O chip.

Table 2-19 CN16 GPIO Connector Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	2	+5V
3	GPO0	4	GPO1
5	GPO2	6	GPO3
7	GPI0	8	GPI1
9	GPI2	10	GPI3
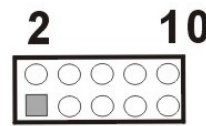
Figure 2-24 CN16 GPIO Connector

These pins connect to the corresponding pins on the LPC I/O chip: sequentially to GP17/GPSA2, GP16/GPSB2, GP15/GPY1, GP14/GPY2, GP13/GPX2, GP12/GPX1, GP11/GPSB1, and GP10/GPSA1.

17. CN17: Parallel Port Connector

13x2 pin header 2.54mm connector

CN17 is an IEEE1284 compatible interface. Usually, the parallel port connects to a printer. This port is provided as a 26-pin 2.54mm pin header.

An adapter cable is required 2x13 pin header-to-parallel D-SUB w/ screws for securing to a chassis panel.

Table 2-20 CN17 Parallel Port Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	PRN_STB#	2	PRN_AFD#
3	PRN_PD0	4	PRN_ERR#
5	PRN_PD1	6	PRN_INIT#
7	PRN_PD2	8	PRN_SLIN#
9	PRN_PD3	10	GND
11	PRN_PD4	12	GND
13	PRN_PD5	14	GND
15	PRN_PD6	16	GND
17	PRN_PD7	18	GND
19	PRN_ACK#	20	GND
21	PRN_BUSY	22	GND
23	PRN_PE	24	GND
25	PRN_SLCT	26	N/C
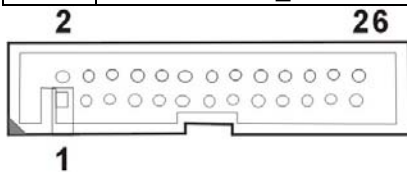
Figure 2-25   CN17 Parallel Port

18. CN18: COM2/3 Internal Serial Port

Table 2-21 CN18: 14 (2x7) Pin 2.0mm Connector Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	DCD2	2	DSR2
3	RXD2	4	RTS2
5	TXD2	6	CTS2
7	DTR2	8	COM_RI2
9	GND	10	GND
11	TXD485+	12	TXD485#
13	RXD485+	14	RXD485#
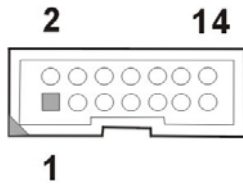
Figure 2-26   CN18: COM2/COM3 Serial Port

The connection to the CN18 serial port requires an adapter cable as shown below.
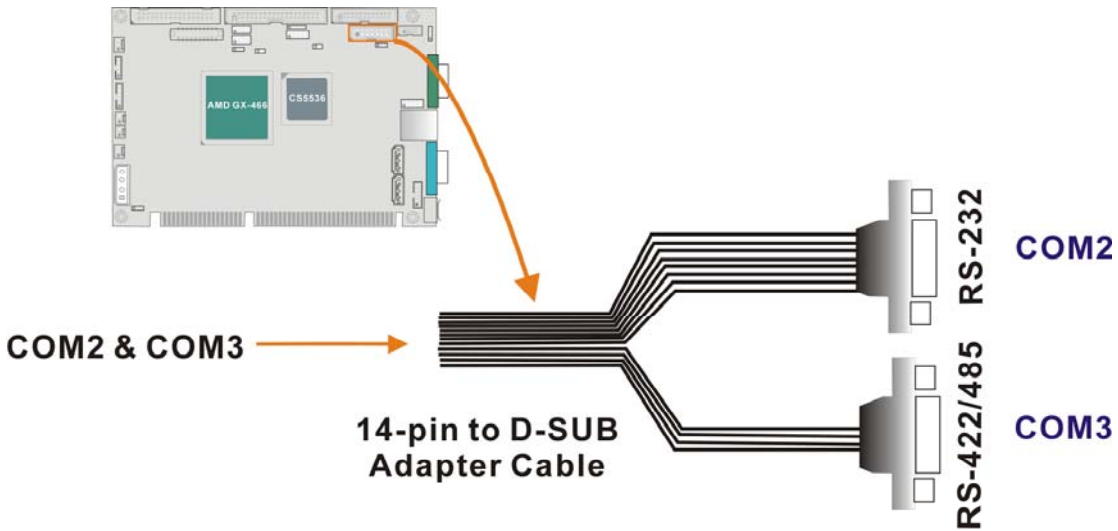
Figure 2-27   COM2/COM3 Serial Port Adapter Cable

✓ **NOTE:**

1. If you want to use the RS485 mode, just connect to TXD485-, TXD485+. If you want to use the RS422, please connect to TXD485-, TXD485+, RXD485-, and RXD485+.
2. Please refer to Chapter 3 for details on serial port operation modes; e.g., powered pins configuration.

19. CN19: Audio Port Connector

This port connects to AC'97 compatible audio devices through an adapter cable, e.g., that features a 10-pin header to audio phone jacks on a slot bracket.

Table 2-22   CN19 Audio Port Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	LINEOUTR	2	LINEINR
3	GND	4	GND
5	LINEOUTL	6	LINEINL
7	GND	8	GND
9	MIC1_IN	10	MIC2_IN
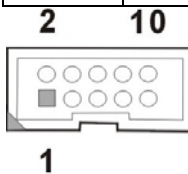
Figure 2-28   CN19 Audio Port Connector

20. CN20: Optical Drive Audio LINE_IN

CN20 provides the connectivity to the audio input from optical drives.

Table 2-23   CN20 Audio LINE_IN Pinouts

PIN	DESCRIPTION
1	CD_L
2	CD_GND
3	CD_GND
4	CD_R

Figure 2-29   CN20 Audio LINE_IN

✅ NOTE:

CN21 to CN24 are 90-degree connectors located on the slot bracket facing the rear-side of a chassis. These connectors will be described in the following section.

---

21. CN25: KB/MS Connector

This port connects to a PS/2 keyboard and mouse using a 6-pin-to-PS/2 adapter cable. The adapter cable has one 6-pin header at one end, and two PS/2 connectors on the other 6-pin-to-two PS/2.

Table 2-24 CN25 KB/MS Connector Pinouts

PIN	DESCRIPTION
1	VCC_KM
2	MS_DATA
3	MS_CLK
4	KB_DATA
5	KB_CLK
6	GND

Figure 2-30   CN25 KB/MS Connector

22. CN26 & CN27: SATA (Serial ATA) Disk Drive Connectors

These 7-pin standard Serial ATA ports connect to SATA I-compatible hard disk drives. SATA drives are managed by the ALi chipset onboard.

Table 2-25   Serial ATA Port Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	2	SATA_TX
3	SATA_TX#	4	GND
5	SATA_RX#	6	SATA_RX
7	GND		
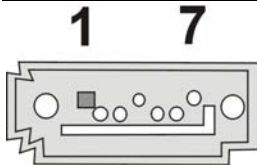
Figure 2-31   Serial ATA Port

23. CN28: Compact Flash Connector)

The CN28 socket allows you to attach a Compact Flash Disk that appears as either the Master or Slave device on the Primary

IDE channel. The CN28 socket supports both the TYPE II and TYPE I modules.

Table 2-**26 CN28 Pinouts**

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	26	VCC-IN CHECK1
2	DATA3	27	DATA11
3	DATA4	28	DATA12
4	DATA5	29	DATA13
5	DATA6	30	DATA14
6	DATA7	31	DATA15
7	HDC_CS0#	32	HDC_CS1
8	N/C	33	N/C
9	GND	34	IOR#
10	N/C	35	IOW#
11	N/C	36	VCC_COM
12	N/C	37	IRQ15
13	VCC_COM	38	VCC_COM
14	N/C	39	CSEL
15	N/C	40	N/C
16	N/C	41	HDD_RESET
17	N/C	42	IORDY
18	SA2	43	SDREQ
19	SA1	44	SDACK#
20	SA0	45	HDD_ACTIVE#
21	DATA0	46	PDIAG
22	DATA1	47	DATA8
23	DATA2	48	DATA9
24	N/C	49	DATA10
25	VCC-IN CHECK2	50	GND

24. CN29: 200-pin DDR Memory Socket

This socket receives a DDR 266MHz memory module.

Rear Slot Bracket Connectors

Figure 2-32 Front Panel Connectors

1. CN21: COM1 Serial Port

This D-SUB serial port is defined as COM1 and provides serial connection in the RS-232 mode.

Table 2-27   Serial Port COM1 Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	NRLSD1	6	NDSR1
2	NRX1	7	NRTS1
3	NTX1	8	NCTS1
4	NDTR1	9	COM_RI1
5	GND		

2. CN22: 10/100BaseT Ethernet (RJ-45) Port

The RJ-45 connector provides 10/100BaseT Ethernet connection to a local or internet network. Refer to the table below for the Ethernet port LED indication.

Figure 2-33   10/100BaseT Ethernet (RJ-45) Port

Table 2-28   CN22 Ethernet Port Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	TX-	5	N/C
2	N/C	6	RX-
3	TX-	7	N/C
4	RX+	8	N/C

3. Ethernet Port LED Indicators

Table 2-29　CN22 Ethernet Port LED Indications

SPEED LED		ACT/LINK LED	
Status	Description	Status	Description
GREEN	ON: 100MB OFF: 10MB	YELLOW	ON: Linked Flashing: Activity

4. CN23: VGA Port

This 15-pin D-SUB VGA port connects to a CRT or LCD display monitor.

Table 2-30　CN23 VGA Port Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VGA_R	9	N/C
2	VGA_G	10	GND
3	VGA_B	11	N/C
4	N/C	12	SSDA
5	GND	13	VGA_HS
6	GND	14	VGA_VS
7	GND	15	SSCL
8	GND		

5. CN24: PS/2 Port

This a PS/2 port connects to a PS/2 compatible keyboard or mouse.

Chapter

3
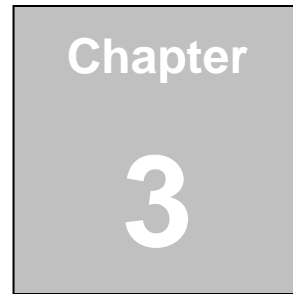
Installation

Considerations Prior to Installation

Preparing Your SBC

The embedded board contains numerous delicate electronic circuits and components, which can become damaged as a result of electrostatic discharge (ESD). Thus, prior to installation, please follow the instructions below:

1.   Please turn off the computer and unplug its power cord.

2.   When handling the board, avoid touching any metal leads or connectors.

3.   It is best to wear an electrostatic discharge (ESD) cuff when handling electronic components (CPU, RAM).

4.   Prior to installing the electronic components, please have these items on top of an anti-static pad or within an electrostatic shielding container.

5.   Please verify that the power supply is switched off before unplugging the power supply connector from the motherboard.

Installation Notices

1.   Prior to installation, please do not remove the stickers on the system board. These stickers are required for warranty validation.

2.   Prior to the installation of the system board or any hardware, please first carefully read the information in the provided manual.

3.   Before using the product, please verify that all cables and power connectors are connected.

4.   To prevent damage to the SBC card, please do not allow screws to come in contact with the PCB circuit, connector pins, or its components.

5.   Please make sure there are no leftover screws or metal components placed on the PCB board or within the computer casing.

6.   Please do not place the computer system on an uneven surface.

7.   Turning on the computer power during the installation process can lead to damage to system components as well as physical harm to the user.

8.   If you are uncertain about any installation steps or have a problem related to the use of the product, please consult a certified computer technician.

Airflow Consideration

Although the SBC can operate without active cooling, it is still necessary to install the SBC card in a chassis with ventilation holes on the sides allowing airflow to travel through the heatsink surface. In a system with an individual power supply unit, the cooling fan of a power supply can also help generate airflow through the board surface.

Unpacking Precautions

Some components on the CPEx GX-333-X are very sensitive to static electric charges and can be damaged by a sudden rush of power. To protect it from unintended damage, be sure to follow these precautions:

- Ground yourself to remove any static charge before touching your PCB. You can do so by using a grounded wrist strap at all times or by frequently touching any conducting materials that is connected to the ground.

- Handle your PCB by its edges. Do not touch IC chips, leads or circuitry if not necessary.

- Do not plug or unplug any connector or jumper while the power is on.

- Do not place a PCB on top of an anti-static bag. Only the inside of the bag is safe from static discharge.

Memory Module

In addition to the onboard 256MB memory, another DDR 266MHz, 256MB or 512MB in size, 200-pin SODIMM module can be added.

Jumper Settings

 NOTE:

A jumper is a metal bridge that is used to close an electrical circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the ins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.
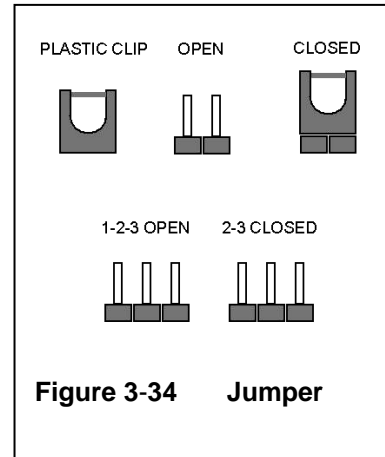
Figure 3-34　　Jumper
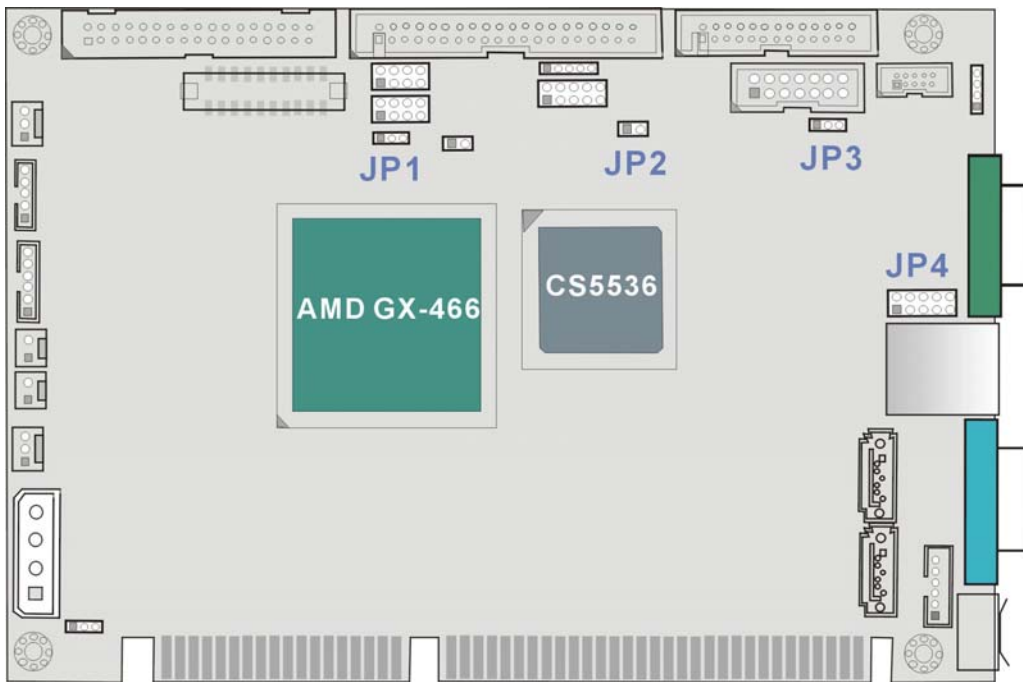
Figure 3-35 Board Version 1.10 and Version 1.11 **Locations of Configuration Jumpers**

JP1: CRT/Flat Panel Display Selector

Table 3-**31 JP1 Pin Configuration**

PIN STATE	DESCRIPTION
1 - 2	Select Panel
2 – 3 (Default)	Select CRT

JP2: (AT/ATX Mode Selector)

This jumper block controls the way you connect to a power supply.

JP2	
PIN STATE	**DESCRIPTION**
Short 1 - 2	Use AT Power
Open 1 - 2	Use ATX Power

Note: JP2 Short 1-2, if you use ATX Power will be auto power on!

JP3: COM3 RS-422/485 Mode Selector

Table 3-**32 JP3 Pin Configuration**

PIN STATE	DESCRIPTION
1-2	RS-422
2-3	RS-485
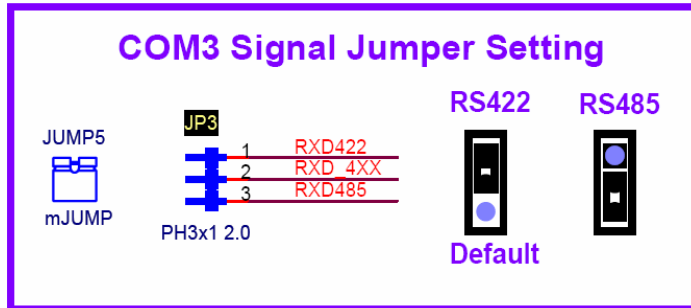
Figure 3-36   JP3 Pin Combinations

JP5: Flat Panel TTL (CN10) power using select

Table 3-**3 JP5 Pin Configurations**

JP5	
PIN STATE	**DESCRIPTION**
Short 1 - 2	+ 3.3V
Short 2 - 3	+ 5V

JP6: Flat Panel TTL (CN10) Clock using select

Table 3-**4 JP6 Pin Configurations**

JP6	
PIN STATE	**DESCRIPTION**
Short 1 – 2 Default	FPCLK
Short 2 - 3	FPCLK#

Installation
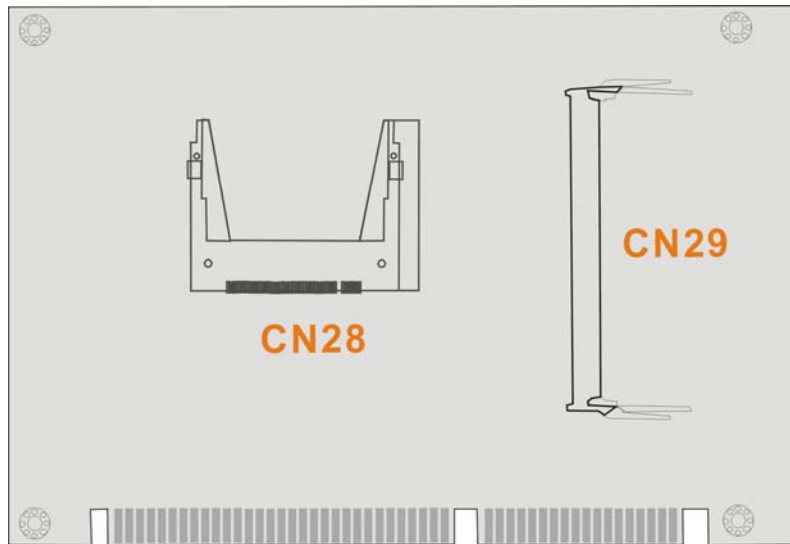
Figure 3-**37   Soldering Side Sockets**

IDE Hard Disk Drive and Optical Drive Connector

The CPEx GX-333-X provides 1 IDE channel which allows the connection to two Enhanced Integrated Device Electronics hard disk drives or optical drives. The IDE controller is attached to a PCI interface. The advanced IDE controller supports up to Mode 4 and ATA-66 in transfer speed.

Connecting Hard Disk Drives

IDE bus devices are daisy-chained using a standard 40-pin IDE cable. Connection is made by connecting one end of the cable to the IDE connector. The connector has a keyed pin which prevents you from inserting the connector in a wrong direction. The read wire corresponds to pin 1 on the connector.

Plug the other end of the cable into the Enhanced IDE hard drive, with pin 1 on the cable corresponding to pin 1 on the hard drive connector.

Note that when connecting two IDE disk drives you will have to configure one as the master and the other the slave. The configuration is done by setting the jumpers on the disk drives.

Optional Floppy Drive Connector (CN9)

This connector provides access to one (1) or two (2) externally mounted floppy drives (3.5"-profile, 1.44 MB type floppy drive).

A standard 34-pin floppy connector cable is required for the connection to floppy drives.

Connecting the Floppy Drive

1. Plug the standard 34-pin floppy cable connector into CN9. Make sure that the red wire corresponds to pin one on the connector.

2. Attach the appropriate connector on the other end of the cable to the floppy drive.

Compact Flash Disk

When appropriately formatted, a compact flash disk can serve as a bootable hard drive in applications where installation space is limited. The Compact Flash card occupies either the Master or Slave device on the Primary IDE channel. Configuration options can be found through the BIOS configuration utility.

Parallel Port Connector (CN17)

Parallel port connects to a printer. The CPEx GX-333-X comes with a multi-mode (ECP/EPP/SPP) parallel port. The CN17 parallel port interface features a 26-pin flat-cable connector that requires an adapter cable if a traditional DB-25 connector is preferred. The parallel interface can be re-assigned to LPT2 or LPT3 through the BIOS configuration utility.

The default interrupt channel is IRQ7. Select ECP or EPP DMA mode using the BIOS configuration utility.

Audio Interface

Audio Connector

AC'97 Audio signals are interfaced through a 10-pin audio adapter kit with 10-pin header on one end and phone jacks on the other end. These signals include Microphone line-in, line-in stereo, and line-out stereo.

COM Port Connectors [COM1(CN21), COM2/COM3(CN18)]

The CPEx GX-333-X provides three (3) serial ports (COM1: RS-232; COM2: RS-232/422/485) interfaced through one DB-9 connector (COM1) and one 14-pin combo male header. These serial ports facilitate the connection to serial devices or a communication network, e.g., terminal console.

LCD Flat Panel Connection (CN10,)

The VGA/TFT interface on the CPEx GX-333-X connects conventional CRT displays and flat panel displays including passive LCD and active LCD displays. There are two (2) connectors onboard for the connection to the two (2) display types:

1. CRT VGA monitors
2. TFT flat panel displays

One CRT display connector (CN23) is provided as a 15-pin, female D-SUB to connect conventional CRT displays. Pin assignments can be found in ***Chapter 2 Functional Description***.

Flat Panel Display Connector (CN10):

CN10 is a 40-pin connector, Hirose DF13A-40DP-1.25V, which can support a 24-bit LCD panel. A bias control signal, ENVEE, active high on CN10, controls the LCD bias voltage. The LCD bias voltage shall not be applied until the +5V or +3.3V logical supply and panel video signals become stable. When powered on, the control signal remains low until receiving the flat panel signals.

Ethernet Connection (CN22)

The onboard 32-bit PCI-bus Ethernet interface is fully compliant with IEEE 802.3U 10/100Mbps CSMA/CD standards. The 10/100BaseT connector connections are made via a standard RJ-45 connectors on the slot bracket.

USB Connection (CN12 and CN13)

The combo USB headers (CN12 and CN13) provide the connectivity of up to four (4) USB (Universal Serial Bus) ports. The USB interface features complete Plug and Play, and hot attach/detach for up to 127 external devices, compliance with USB specification Rev. 2.0. An adapter 8-pin-to-USB cable is required for connecting to these USB interfaces. The adapter cable has one (1) 4x2-pin connector on one end and standard USB connectors on the other.

Accessories Included in Kit

CYBERRESEARCH provides the following cables to facilitate connections to your peripheral devices. For more information on the locations of the connectors, please refer to *Chapter 2*. Cables not included in kit are the user supplied items and should be separately purchased.

Table 3-33   Cables and Accessories Included in Kit

No.	Type
1	IDE flat cable 40p/40p/40p
2	SATA cable
1	SATA power cable
1	PS/2 KB/MS cable
1	Audio adapter cable
1	COM2 serial port cable

Chapter

4

Award BIOS Setup

Introduction

A licensed copy of Phoenix Award BIOS is preprogrammed into the ROM BIOS. The BIOS setup program allows users to modify the basic system configuration. This chapter describes how to access the BIOS setup program and the configuration options you may change.

Starting Setup

The Phoenix Award BIOS is activated when you turn on the computer. The setup program can be activated in one of two ways.

- Press the **DELETE** key as soon as the system is turned on or
- Press the **DELETE** key when the "**Press Del to enter SETUP**" message appears on the screen.

If the message disappears before you respond, you must restart your computer and try again.

Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press **ESC** to quit. Navigation keys are shown in.

Key	Function
Up arrow	Move to the item above
Down arrow	Move to the item below
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
+/Page up	Increase the numeric value or make changes
-/Page down	Decrease the numeric value or make changes
Esc	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
F1	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2	Item help
F5	Previous values for the page menu items
F6	Fail-safe defaults for the current page menu items
F7	Optimized defaults for the current page menu items
F9	Menu in BIOS
F10	Save changes and Exit BIOS

Table 4-1: BIOS Navigation Keys

Getting Help

When you press **F1** a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **ESC** or the **F1** key again.

Unable to Reboot After Configuration Changes

If you are unable to boot your computer after you have made changes to the system configuration, you must restore the CMOS defaults. Use the jumper described in **Chapter 3**.

Main BIOS Menu

Once the BIOS opens, the main menu appears.

NOTE:

The following sections will completely describe the menus listed below and the configuration options available to users.

The following menu options are seen in the Main Menu.

1. **Standard CMOS Features:** Changes the basic system configuration.
2. **Advanced BIOS Features:** Changes the advanced system settings.
3. **Advanced Chipset Features:** Changes the chipset configuration features
4. **Integrated Peripherals:** Changes the settings for integrated peripherals
5. **Power Management Setup:** Allows you to configure power saving options
6. **PCI/PnP Configurations:** Changes the advanced PCI/PnP Settings
7. **PC Health Status:** Menu that monitors essential system parameters

The following user configurable options are also available in the BIOS Main Menu

➔ **Load Fail-Safe Defaults**

This option allows you to load failsafe default values for each of the parameters on the Setup menus. **F6 key can be used for this operation on any page.**

➔ **Load Optimized Defaults**

This option allows you to load optimal default values for each of the parameters on the Setup menus. **F7 key can be used for this operation on any page.**

➔ **Set Supervisor Password**

By default no **Supervisor Password** is set. If you wish to install a supervisor password, select this field and enter the password. After this option has been selected, a red dialogue box with **"Enter Password: "** will appear. You will be asked to confirm your password. Retype the original password into the **"Confirm Password: "** dialogue box and press enter.

➔ **Set User Password**

By default no **User Password** is set. If you wish to install a user password, select this field and enter the password. After this option has been selected, A red dialogue box with **"Enter Password: "** will appear. You will be asked to confirm your password. Retype the original password into the **"Confirm Password: "** dialogue box and press enter.

➔ **Save & Exit Setup**

If you have finished making the configuration changes and wish to save them and exit the BIOS menus, select this option.

➔ **Exit Without Saving**

If you have finished making configuration changes but do not want to save them and you want to exit the BIOS menus, select this option.

Standard CMOS Features

The **Standard CMOS Features** menu allows you to set basic BIOS configuration options.

The **Standard CMOS Features** menu allows you to set both the date and the time field:

1.   **Date [mm:dd:yy]**: Allows you to set the system date.
2.   **Time [hh/mm/ss]:** Allows you to set the system time.

➔   **IDE Primary Master and Slave**

When entering setup, BIOS auto detects the presence of IDE devices. This displays the status of the auto detected IDE devices. The following IDE devices will be detected and are shown in the **Standard CMOS Features** menu:

1.   Primary IDE Master
2.   Primary IDE Slave

The IDE Configuration menu allows you to set or change the configurations for the IDE devices installed in the system. If an IDE device is detected, and one of the above listed BIOS configuration options are selected, the IDE configuration options shown in **Section 0** appear.

➔   **Drive A [1.44M, 3.5in]**

The **Drive A** configuration option determines the type of floppy drive installed in the system. The floppy drive configuration options are listed below.

1.   None
2.   1.44M, 3.5 in (DEFAULT)

➔   **Video [EGA/VGA]**

The **Video** configuration option determines the type of display connected to the system. The video display options are listed below. Basically this item should be left unchanged.

1.   EGA/VGA
2.   CGA 40
3.   CGA 80
4.   MONO

➔   **Halt On**

The **Halt On** category allows users to determine whether the computer will stop if an error is detected during power up.

➔ **All Errors**	(DEFAULT)	Whenever BIOS detects a non-fatal error the system will be stopped and you will be prompted.
➔ **No Errors**		The system boot will not be stopped for any errors that may be detected
➔ **All, But Keyboard**		The system boot will not stop for a keyboard error; it will stop for all other errors.
➔ **All, But Diskette**		The system boot will not stop for a disk error; it will stop for all other errors.
➔ **All, But Disk/Key**		The system boot will not stop for a keyboard or a disk error; it will stop for all other errors.

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➔   **Base Memory:**

The **Base Memory** is NOT user configurable. The POST will determine the amount of base (or conventional) memory is installed in the system. The value of the base memory is typically 512K for systems with 512K memory installed on the CPU card or 640K for systems with 640K or more memory installed on the motherboard.

➔   **Extended Memory**

The **Extended Memory** is NOT user configurable. The BIOS determines how much extended memory is present during the POST. This is the amount of memory above 1MB located in the memory address map of the CPU.

➔   **Total Memory**

The **Total Memory** is NOT user configurable.

IDE Channel Master
The **IDE Channel Master** menu allows you to set or change the configurations for the master and slave IDE devices for both channel 0 and channel 1.

➔   **IDE HDD Auto-Detection [Press Enter]**

Selecting **IDE HDD Auto-Detection** option and pressing the "**ENTER**" key will enable the BIOS to automatically detect the HDD type. Do not set this option manually.

➔   **IDE Channel 0/1 Master/Slave [Auto]**

The **IDE Channel** option allows you to activate or deactivate the following drive channels:

1.	Channel 0 Master
2.	Channel 0 Slave

➔	**None**		If you have no drives connected to the IDE channel select this option. Once set, this IDE channel will become inaccessible and any drives attached to it undetected.
➔	**Auto**	(DEFAULT)	Setting this option allows the device to be automatically detected by the BIOS
➔	**Manual**		Selecting this option allows you to manually configure the device on the IDE channel in BIOS.

➔   **Access Mode [Auto]**

The **Access Mode** option allows you to determine the hard disk BIOS translation modes. Most systems now use hard drives with large capacities and therefore either the LBA translation mode or auto should be selected.

➔	**CHS**		Select this mode if the HDD capacity is less than 504MB.
➔	**LBA**		Select this mode if the HDD capacity is more than 8.4GB.
➔	**Large**		This mode is an extended ECHS mode and while it supports HDDs larger than 504MB, it is not recommended.
➔	**Auto**	(DEFAULT)	If you are unsure of what access mode to set, select this option

➔ **Capacity**

The **Capacity** specification tells the user the storage capacity of the HDD installed in the system.

➔ **Cylinder**

The **Cylinder** specification tells the user how many cylinders (tracks) are on the HDD installed in the system.

➔ **Head**

The **Head** specification tells the user how many logical heads are on the HDD installed in the system.

➔ **Precomp**

The **Precomp** specification tells the user on what track the write pre-compensation begins.

➔ **Landing Zone**

The **Landing Zone** specification tells the user where the disk head will park itself after the system powers off.

➔ **Sector**

The **Sector** specification tells the user how many logical sectors the HDD has been divided into.

Advanced BIOS Features

The **Advanced BIOS Features** menu allows you to access CPU and peripheral device configuration options.

Once the **Advanced BIOS Features** menu is selected, two menu options and a host of configuration options are available. The two menu options are:

    1.   CPU Feature
    2.   Hard Disk Boot Priority

To access these menus, use the arrow keys to select the menu option and press the "**ENTER**" button. The menu will appear below.

➔ **Virus Warning [Disabled]**

When this item is enabled, the BIOS will monitor the boot sector and partition table of the HDD for any attempt at modification. If an attempt is made, the BIOS will halt the system and an error message will appear. Afterwards, if necessary, you will be able to run an anti-virus program to locate and remove the problem before any damage is done.

➔	**Enabled**	Activates automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector or HDD partition table.
➔	**Disabled** (Default)	No warning message will appear when anything attempts to access the boot sector or HDD partition table.

NOTE:

> Many disk diagnostic programs can cause the above warning message to appear when the program attempts to access the boot sector table. If you will be running such a program, it is recommended that you first disable the virus protection function before hand.

➔ **CPU Internal (L1 & L2) Cache [Enabled]**

The **CPU L1 & L2 Cache** option allows users to select whether the CPU primary cache (L1) and secondary cache (L2) will be turned on or off.

➔ **Enabled** (DEFAULT)   The L1 and L2 CPU caches are both turned on
➔ **Disabled**   The L1 and L2 CPU caches are both turned off

➔ **SATA Boot ROM Control**

When enabled, the ALi or ULi SATA ROM management utility will provide the access to RAID configuration utility during the POST stage and allow you to boot from SATA disk drives. You may refer to *Appendix C* for more details. .

➔ **Boot Device**

There are three **Boot Device** configuration options. They are:

1.   **First Boot Device** [DEFAULT: Floppy]
2.   **Second Boot Device** [DEFAULT: Hard Disk]
3.   **Third Boot Device** [DEFAULT: LS120]

The **Boot Device** configuration options allow you to select the order of devices the computer will boot from. Using the default values, the system will first look for a FDD to boot from. If it cannot find an FDD it will use an HDD to boot from. If both a FDD and a HDD are unavailable then the system will boot from a LS120 (Super Disk) drive.

Boot Device configuration options are:

1.   Floppy
2.   LS120
3.   HDD-0
4.   SCSI
5.   CDROM
6.   HDD-1
7.   ZIP100
8.   USB-FDD
9.   USB-ZIP
10.   USB-CDROM
11.   USB-HDD
12.   LAN
13.   Disabled

➔ **Boot Other Device [Enabled]**

The **Boot Other Device** option determines whether the SBC will use a second or third boot device if the first boot device is not found.

> ➔ **Enabled** (DEFAULT) The system will look for second and third boot devices if the first one is not found.
> ➔ **Disabled** The system will not look for second and third boot device if the first one is not found.

➔ **Swap Floppy Drive [Disabled]**

This option allows you to change floppy drive designation (drive A: or B:) without changing the physical cabling.

➔ **Boot Up Floppy Seek [Enabled]**

During the POST, BIOS will determine if the floppy disk drive installed has 40 or 80 tracks. 360K FDDs have 40 tracks while 760K, 1.2M and 1.44M FDDs all have 80 tracks

> ➔ **Enabled** BIOS searches for a FDD to determine if it has 40 or 80 tracks. Note that BIOS cannot tell the difference between 720K, 1.2M or 1.44M drives as they all have 80 tracks.
> ➔ **Disabled** (DEFAULT) BIOS will not search for the type of FDD drive by track number. Note that there will not be any warning message if the drive installed is 360K.

➔ **Boot Up Numlock Status [On]**

The **Boot Up Numlock Status** option allows you to determine the default state of the numeric keypad.

> ➔ **Off** The keys on the keypad will be arrow keys
> ➔ **On** (DEFAULT) The keys on the keypad will be number keys

➔ **Typematic Rate Setting [Disabled]**

Disabling the **Typematic Rate Setting** configuration option only allows one character to appear onto the screen if a key is continuously held down. In other words, the BIOS will only report the key is down. When this option is enabled, the BIOS will report as before, but it will then wait a moment, and, if the key is still down, it will begin to report that the key has been depressed repeatedly. Such a feature would be used to accelerate cursor movements with the arrow keys.

> ➔ **Disabled** (DEFAULT) Disables the typematic rate
> ➔ **Enabled** Enables the typematic rate

➔ **x Typematic Rate (Chars/sec) [6]**

The **Typematic Rate** can only be configured if the **Typematic Rate Setting** is Enabled. The **Typematic Rate** configuration field determines the rate keys are accelerated.

> ➔ **6** (DEFAULT) 6 characters per second
> ➔ **8** 8 characters per second
> ➔ **10** 10 characters per second
> ➔ **12** 12 characters per second
> ➔ **15** 15 characters per second
> ➔ **20** 20 characters per second

➔	**24**	24 characters per second
➔	**30**	30 characters per second

➔ **Gate A20 Option**

This option determines the Gate A20 control options. This option only avails in older, DOS, or 16-/32-bit operating systems. For systems running newer, protected or real mode, operating systems, this option should never be changed.

➔ **x Typematic Delay (Msec) [250]**

The **Typematic Delay** can only be configured if the **Typematic Rate Setting** is enabled. The **Typematic Delay** configuration field allows you to select the delay between when the key was first depressed and when the acceleration begins.

➔	**250**	(DEFAULT)	250 milliseconds
➔	**500**		500 milliseconds
➔	**750**		750 milliseconds
➔	**1000**		1000 milliseconds

➔ **Security Option [Setup]**

The **Security Option** configuration option allows you to limit access to the system and Setup or just to the Setup.

➔	**Setup**	(DEFAULT)	The system will not boot and access to Setup will be denied if the correct password is not entered at the prompt.
➔	**System**		The system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.

✔ **NOTE:**

> To disable security, select the password setting in the **Main Menu**. When asked to enter a password, do not type anything, press, "**ENTER**" and the security is disabled. Once the security is disabled, the system will boot and you can enter Setup freely.

➔ **OS Select For DRAM > 64MB [Non-OS2]**

The **OS Select For DRAM > 64MB** option allows you to specify the operating system you are using. This option only applies when using IBM OS2 operating system.

➔	**Enabled**		Only select this if you are using the OS/2 operating system
➔	**Disabled**	(DEFAULT)	If you are not using the OS/2 operating system then disable this function.

➔ **Video BIOS Shadow [Enabled]**

When enabled, the video BIOS is copied to the system RAM for quicker access. Shadowing

boosts BIOS turnaround speed for that BIOS is accessed by CPU through the memory bus rather than the original 8-bit X bus.

➔ **C8000-CBFFF to DC000-DFFFF Shadow [Disabled]**

When enabled, this setting avails adapter ROM shadowing for the located 16K block of memory. It is designed to speed up the access to BIOS code in adapters, e.g., a network expansion card, using this memory space from slow ROM into faster RAM.

➔ **Small Logo (EPA) Show [Disabled]**

The **Small Logo (EPA) Show** option determines if the Environmental Protection Agency (EPA) logo will appear during the system boot-up process. If it is enabled then the boot up process may be delayed.

> ➔ **Enabled**   EPA logo will appear during the boot up process.
> ➔ **Disabled**   (DEFAULT)   EPA logo will not appear during the boot up process.

➔ **Delay For HDD (Secs) [3]**

A large number can be applied for slowly-initiated (longer spin-up time) hard drives depending on the specifications provided by your hard drive vendors.

➔ **Cyrix 6x86/MII CPPUID [Enabled]**

This option determines whether to use the function of controlling or accessing the Cyrix 6x86/MII CPU ID.

Advanced Chipset Features

➔ **Video Memory Size [8 M]**

This option selects the size of the graphics aperture. The aperture is a portion of the PCI memory address range dedicated as graphics memory address space. Host cycles that hit the aperture range are forwarded to the graphics controller without need for translation. This size also determines the maximum amount of system RAM that can be allocated to the graphics card for texture storage.

➔ **Output Display [Panel & CRT]**

This option allows you to select either one of the display types (Flat Panel & CRT) or both of the display types connected to the embedded board.

➔ **Flat Panel Configuration [Press Enter]**

The **Flat Panel** configuration provides access to fine-tune the flat panel display characteristics. The options include:

1. LVDS, TFT, or auto-detect the LCD display connection.

2. Resolutions ranging from 320x420 to 1600x1200 pixels.

3. 9-24 bits, 1 ppc or 18, 24 bits, 2ppc.

4. Refresh Rate ranging from 60 to 100Hz.

5. HSYNC Polarity value to High or Low.

6. VSYNC Polarity value to High or Low.

7. SHFCLK Active Period time to Active Only or Free running.

8. LP Active Period time to Active Only or Free Running.

➔ **Overcurrent Reporting [Disabled]**

If set to enabled and the detected current exceeds safety thresholds, the audible alarm will be sounded.

➔ **Port 4 Assignment [Host]**

Factory default is Host. This is a factory reserved function.

➔ **UART Port A**

This item allows you to select a starting address from hex 3F8/IRQ4 to 2E8/IRQ3 for the first serial port.

➔ **Onboard Audio [Enabled]**

The **Onboard Audio** configuration option enables or disables the Realtek AC'97 CODEC onboard.

Integrated Peripherals
The **Integrated Peripherals** menu allows you to change the configuration option for peripheral devices.

The **Integrated Peripherals** menu has three options listed below:

1.	Master Drive PIO Mode
2.	Slave Drive PIO Mode
3.	IDE Primary Master UDMA
4.	IDE Primary Slave UDMA
5.	IDE DMA transfer access
6.	IDE HDD Block Mode
7.	Onboard FDC Controller
8.	Onboard Serial Port 1
9.	Onboard Serial Port 2
10.	Onboard Serial Port 3
11.	UART Mode Select
12.	Onboard Parallel Port
13.	Parallel Port Mode

Select the menu you wish to configure.

OnChip IDE Device
The **OnChip IDE Device** menu allows you to change the IDE device configurations. This item is always enabled.

➔ **Master/Slave Drive PIO Mode [Auto]**

PIO means Programmed Input/Output. Instead of constantly issuing BIOS commands to facilitate I/O transfers to and from the hard disk drives, the PIO mode allows the BIOS to issue I/O requests and let CPU and IDE controller to fulfill the requests. Four modes from 0 to 4 are supported.

1.		IDE Primary Master PIO
2.		IDE Primary Slave PIO

➔ **Auto**   (DEFAULT)   Allows the computer to select the correct mode
➔ **0**   PIO mode 0 selected with a maximum transfer rate of 3.3MBps
    1   PIO mode 1 selected with a maximum transfer rate of 5.2MBps
    2   PIO mode 2 selected with a maximum transfer rate of 8.3MBps
    3   PIO mode 3 selected with a maximum transfer rate of 11.1MBps
    4   PIO mode 4 selected with a maximum transfer rate of 16.6MBps

➔   **IDE Primary Master/Slave UDMA [Auto]**

The Ultra DMA (UDMA) mode for the following HDDs can all be selected.

1.		IDE Primary Master UDMA
2.		IDE Primary Slave UDMA
3.		IDE Secondary Master UDMA
4.		IDE Secondary Slave UDMA

➔ **Auto**   (DEFAULT)   Allows the computer to select the correct UDMA
➔ **Disabled**   Disables the UDMA for the HDD device

➔   **IDE DMA transfer access [Enabled]**

The **IDE DMA transfer access** option allows you to determine whether or not the IDE device installed in the system will have a DMA device.

➔ **Disabled**   The IDE HDD installed in the system will not have DMA transfer access
➔ **Enabled**   (DEFAULT)   The IDE HDD installed in the system will have DMA transfer access

➔   **IDE HDD Block Mode [Enabled]**

The **IDE HDD Block Mode** option should only be enabled if your IDE HDD device supports block mode. Please refer to the documentation that came with your IDE HDD device to check the compatibility.

➔ **Disabled**   The BIOS will not detect block data transfers.
➔ **Enabled**   (DEFAULT)   The optimal number of block read/writes per sector the drive can support will be automatically detected.

➔   **Onboard FDC Controller [Enabled]**

The **Onboard FDC Controller** option allows you to enable or disable the Floppy Drive controller.
.

➔   **Onboard Serial Port # [Auto]**

These options are used to select the port address for specific on-board serial port. The options are 3F8H, 2F8H, 3E8H, 2E8H, Auto and Disable. Port 1 is COM1, Port 2 is Com2 and so on. The operating mode of COM2/COM3 can be selected through jumpers on the embedded board.

➔   **UART Mode Select [Normal]**

This option allows you to select the Infrared transmission mode. Normal is disabled. Operation in the ASKIR mode is comparatively slower.
When a mode is selected the following IR transmission options will become available:
1. RxD, TxD Active [Hi, Lo]
2. IR Transmission Delay [Enabled]
3. UR2 Duplex Mode [Half]
4. Use IR Pins [IR-Rx2Tx2]

➔   **Onboard Parallel Port [378/IRQ7]**

These options are used to select the port address for specific on-board serial port. The options are 378/IRQ7, 278/IRQ5, 3BC/IRQ7, and Disable.

➔ **SPP**	(DEFAULT)	The parallel port will operate in the standard parallel port (SPP) mode. This parallel port mode will work with most parallel port devices but is slow.
➔ **EPP**		The parallel port will operate in the enhanced parallel port mode (EPP). The EPP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the SPP mode.
➔ **ECP**		The parallel port will operate in the extended capabilities port (ECP) mode. The ECP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the SPP mode.
➔ **ECP+EPP**		The parallel port will be compatible with both ECP and EPP devices
➔ **Normal**		

➔   **Parallel Port Mode [SPP]**

These options are used to select the parallel port operating mode. The options are SPP, EPP, ECP, ECP+EPP, and Normal. Two specific options avail when either of the ECP or EPP modes is selected: **EPP Mode Select** and **ECP Mode Use DMA**.

If the **EPP mode** is selected in the **Parallel Port Mode** configuration option, you will be able to configure the **EPP Mode Select** option. The EPP parallel port mode has two standards, EPP 1.7 and EP 1.9. This selection allows you to choose the standard the parallel port will operate in. Please refer to the parallel device that your system will be connected to and select the EPP mode accordingly.

      ➔ **EPP1.9**   EPP 1.9 is selected as the EPP standard
      ➔ **EPP1.7**   (DEFAULT)   EPP 1.7 is selected as the EPP standard

   ➔   **x ECP Mode Use DMA [3]**

If the **ECP mode** is selected in the **Parallel Port Mode** configuration option, you will be able to configure the **ECP Mode Use DMA** option. This option determines the DMA channel the parallel port uses when it is in the ECP mode.

      ➔ 1   Parallel port uses DMA Channel 1 in the ECP mode
      ➔ 3   (DEFAULT)   Parallel port uses DMA Channel 3 in the ECP mode

Power Management Setup
The **Power Management Setup** menu allows you to set the power management and saving features in the BIOS.

   ➔   **Power management [APM]**

The **Power management** option allows you to enable/disable or select one of the following management modes.

      ➔ **Disabled**   The ACPI function is enabled
      ➔ **Legacy**   The Legacy mode allows you to manually define the PM Timers features including Standby Mode, Suspend Mode, and the Soft-off button operations.
      ➔ **APM**   (DEFAULT)   When selected, the APM management is automatically applied and the other configurable option is setting the power button soft-off mode.
      ➔ **ACPI**   Enables the ACPI power management mode. Currently only the S1(POS) mode is supported on this board.

   ➔   **APM Mode**

APM is briefed from Advanced Power Management. The energy-saving standby mode is initiated in the following ways:

- Time-out period specified in the BIOS Setup Utility
  - Commands from the operating system, such as the Suspend menu item in your operating system
  - In standby mode, the SBC reduces power consumption by using the SMM capabilities. Reducing power to or turning off Video Electronics Standards Association (VESA) Display Power Management Signaling (DPMS)-compliant monitors and spinning down hard disks.

  One noticeable point is that the operating system must support an APM driver for the power-management features to work.

➔ **ACPI Mode**

ACPI stands for Advanced Configuration and Power Interface
Under Advanced Configuration and Power Interface (ACPI

ACPI enables the direct control by the operating system over the power management and Plug and Play functions of a computer. ACPI requires an ACPI-aware operating system, such as Windows NT 4.0, Windows 98 SE, Windows 2000, and later.

ACPI features include:

- Plug and Play and Advanced Power Management (APM) functionality as here contained in the BIOS Setup Utility.
- Power management control of individual devices, add-in boards (some add-in boards may require an ACPI-aware driver), video displays, and hard disk drives.
- Features that enables a system to be held in a power-saving mode consuming less than 30-watt computer operation in the Power On Suspend sleeping state, and less than five-watt operation in the Suspend to Disk sleeping state.
- A soft-off feature that enables the operating system to turn off the computer.

➔ **Legacy Mode**

When set to Legacy, you can manually configure the parameters of the following two power-saving modes:

Standby Mode
Defines the continuous idle time before the system enters Standby Mode. If any item defined is enabled & active Standby timer will be reloaded. The standby mode turns screen and hard drives off. The time span configurable ranges from 1 second to 120 minutes.

Suspend Mode

Defines the timeout before the system enters the Suspend Mode. The suspend mode powers down the system and keeps a trickle of power. If an interrupt to RTC reaches, the system wakes up. The time span configurable ranges from 1 second to 120 minutes.

➔ **MODEM Use IRQ**

Select an interrupt request (IRQ) for the specific serial port connecting to a modem. Activity over the IRQ line awakens the system.

➔ **Power-On by Alarm**

When enabled, configurable time alarm will be available below. The system then will awake at the preset time from the soft-off power-saving state.

➔ **IRQ Wakeup Events [Press Enter]**

Press the Enter key on this item to display a list of configuration items. The system will be awaken by the activity of the configured IRQ device. The items include:

	IRQ1 (Keyboard)	[ON]
✓	IRQ3 (COM2)	[OFF]
✓	IRQ4 (COM1)	[OFF]

✓	IRQ5 (LPT2)	[OFF]
✓	IRQ6 (Floppy Disk)	[OFF]
✓	IRQ7 (LPT1)	[OFF]
✓	IRQ8 (RTC Alarm)	[OFF]
✓	IRQ9 (IRQ2 Redir)	[OFF]
✓	IRQ10 (Reserved)	[OFF]
✓	IRQ11 (Reserved)	[OFF]
✓	IRQ12 (PS/2 Mouse)	[ON]
✓	IRQ13 (Coprocessor)	[OFF]
✓	IRQ14 (Hard Disk)	[OFF]
✓	IRQ15 (Reserved)	[OFF]

PnP/PCI Configurations

The **PnP/PCI Configurations** menu allows you to set the plug and play, and PCI options.

➔ **PNP OS Installed [No]**

The **PNP OS Installed** option allows you to determine whether or not installing a PNP(Plug & Play)-aware OS onto your system. If set to Yes, your OS should have the control over all devices installed. If set to NO, your BIOS has the control instead. For integrations involving some legacy ISA devices, it is recommended to turn it off.

➔ **Init Display First**

This item allows to select to boot your system using the PCI graphics card (if implemented) or the onboard graphics controller.

➔ **Reset Configuration Data [Disabled]**

The **Reset Configuration Data** option allows you to reset the Extended System Configuration Data (ESCD) when you exit setup if you have problems booting the system up after you have installed a new add-on.

➔	**Disabled** (DEFAULT)	ESCD will not be reconfigured
➔	**Enabled**	ESCD will be reconfigured after you exit setup

➔ **Resources Controlled By [Auto (ESCD)]**

The **Resources Controlled By** option gives you the option of manually configuring all the boot and plug and play devices, or allowing BIOS to configure these devices automatically. If you allow BIOS to configure it automatically you will not be able to select the IRQs, DMA and memory base address fields because BIOS will automatically assign them.

➔	**Auto(ESCD)** (DEFAULT)	BIOS automatically configures plug and play devices as well as boot devices.
➔	**Manual**	You manually configure the plug and play devices and any other boot devices

➔ **x IRQ Resources [Press Enter]**

If you select manual in the **Resources Controlled By** option then you will be able to configure the **IRQ Resources**. To do this, select **IRQ Resources** and press **ENTER**. A new menu will appear.

The menu will have the following 12 BIOS configuration options:

     1.   IRQ-3 assigned to
     2.   IRQ-4 assigned to
     3.   IRQ-5 assigned to
     4.   IRQ-6 assigned to
     5.   IRQ-7 assigned to
     6.   IRQ-8 assigned to
     7.   IRQ-9 assigned to
     8.   IRQ-10 assigned to
     9.   IRQ-11 assigned to
     10.   IRQ-12 assigned to
     11.   IRQ-13 assigned to
     12.   IRQ-14 assigned to
     13.   IRQ-15 assigned to

The above options all have the same default and the same options. These are listed below.

➔   **PCI Device**   (DEFAULT)   The IRQ is assigned to legacy ISA for devices compliant with the original PC AT bus specification, PCI/ISA PNP for devices compliant with the Plug and Play standard whether designed for PCI or ISA bus architecture.

➔   **Reserved**   The IRQ is reserved by BIOS

➔   **Memory Resources [Press Enter]**

This option allows you to appoint low memory for non-PNP legacy devices. Choices are: Reserved Memory Base and Reserved Memory Length. The memory Base options are NA, C800, CC00, D000, D400, D800, and DC00. The Memory Length options are 8K, 16K, 32K, and 64K.

➔   **PCI/VGA Palette Snoop [Disabled]**

The **PCI/VGA Palette Snoop** option allows you determine whether or not some special VGA cards, high-end hardware MPEG decoders and other similar devices are allowed to look at the VGA palette on the video card so these devices can determine what colors are in use. This option is only *very* rarely needed. It should be left at "Disabled" unless a video device specifically requires the setting enabled upon installation.

➔   **Disabled**   (DEFAULT)   Does not allow the graphics devices to examine the VGA palette on the graphics card

➔   **Enabled**   Does allow the graphics devices to examine the VGA palette on the graphics card

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PC Health Status

The **PC Health Status** menu is a passive menu where you cannot alter any BIOS configurations. This menu shows system operating parameters that are essential to the stable operation of your system.

The following system parameters are monitored by the **PC Health Status** menu.

➔   **CPU Warning Temperature**

This item provides access to setup a temperature threshold on the detected CPU temperature. If the threshold is violated, the onboard beeper will be sounded to warn the user an abnormal thermal condition has occurred, e.g., a cooling fan failure or abnormal rise of ambient temperature. CPU may then generate an idle command to slow down the work speed so that the chip temperature can be reduced.

➔   **Current CPU Temperature, Current Fan Speed, Vcore, VccMem, +3.3V, +5V, +12V, VBAT(V), and 5VSB(V)**

These are the automatically detected values shown for system monitoring.

➔   **Shutdown Temperature [Disabled]**

When a preset threshold is violated, system will commence an automatic shutdown to protect the hardware from overheating. The configurable options are: [Disabled], [60°C/140°F], [65°C/149°F], [70°C/158°F], [75°C/167°F].

Appendix

A
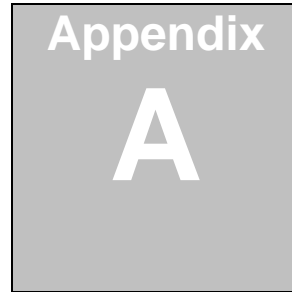
Watchdog Timer

> ### ✔ NOTE:
>
> The following discussion applies to DOS environment. It is recommended you contact CYBERRESEARCH support or visit our website for specific drivers for more sophisticated operating systems, e.g., Windows and Linux.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMI or a software bug. When the CPU stops working correctly, Watchdog Timer will either perform a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer:

INT 15H:

AH – 6FH
Sub-function: AL – 2: Set the Watchdog Timer's period BL   : Time-out value(Its unit--second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

You have to call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer will start counting down. While the timer value reaches zero, the system will reset. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the Watchdog timer will be disabled if you set the time-out value to be zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the

operating system (DOS), such as disk I/O that can be very time-consuming.

> **NOTE:**
>
> When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system will reset.

Example program:

; **INITIAL TIMER PERIOD COUNTER**

;
W_LOOP:

```
    MOV    AX, 6F02H          ;setting the time-out value
    MOV    BL, 30                      ;time-out value is 48 seconds
    INT    15H
```

 ;
; **ADD YOUR APPLICATION PROGRAM HERE**

;
```
    CMP    EXIT_AP, 1                 ;is your application over?
    JNE    W_LOOP            ;No, restart your application

    MOV   AX, 6F02H          ;disable Watchdog Timer
    MOV   BL, 0                          ;
    INT    15H
```
;
; **EXIT** ;

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Connecting ATX Power Supply

The following notes show how to connect ATX Power Supply to the embedded board.

1. Using ATX Power Switch

✓ NOTE:

> The following diagram describes an ATX power connection for the 1.10 version of the CPEx GX-333-X. To connect the 1.11 version of the CPEx GX-333-X to an ATX power supply, use the CN6 connector instead of the CN4 connector shown below. Refer to the CN6 connector pinouts in **Chapter 2** for appropriate power button pin locations.

Step 1. Disconnect the AC cord of the Power Supply from the AC source to prevent sudden electric surge to the board.

Step 2. Remove the jumper cap on JP2.

Step 3. Your ISA interface backplane should come with the associated 5VSB and PS_ON pin connector. Usually connecting these two pins is sufficient. Also, an ATX power feature cable should come ready with your backplane. Connect CN3 to the associated connector on your backplane.
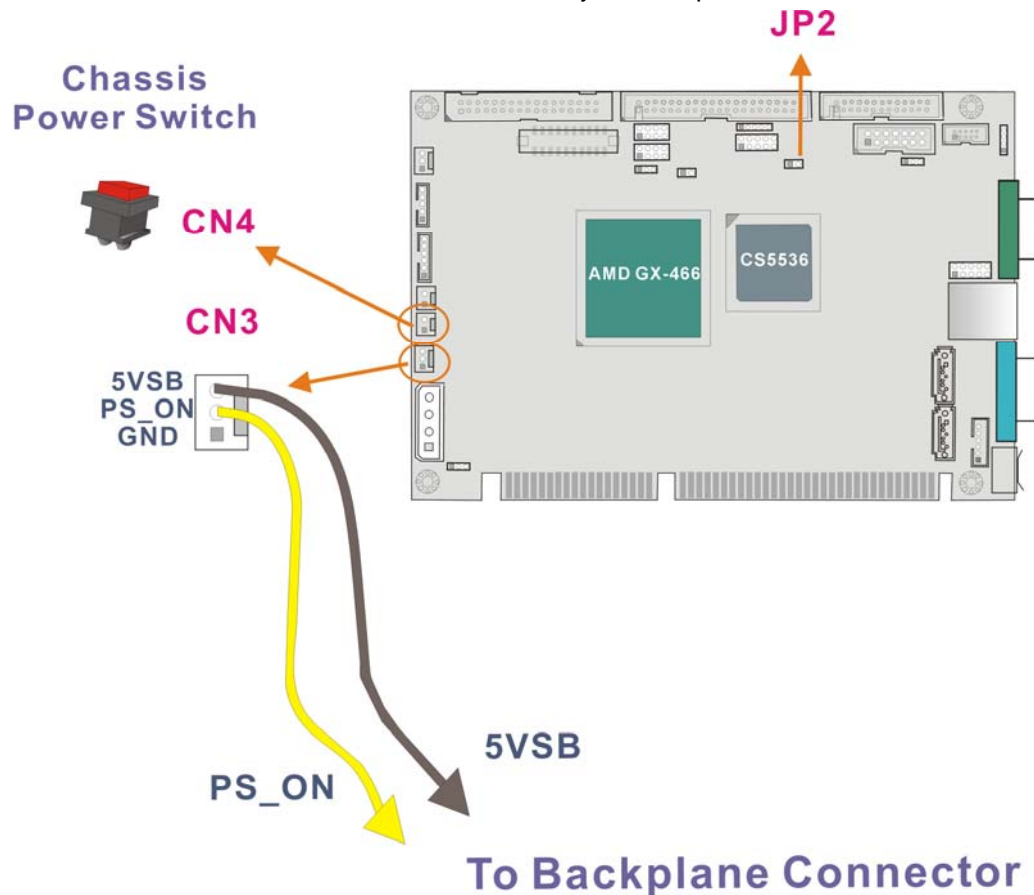

Figure B-**34**   **ATX Power Connection**

**Step 4.** Connect CN4 to the chassis power switch.

Step 5.   To turn on the system press the button once. To turn off the power supply press the ATX power switch button for about 4 seconds.

2.   Using AT Power Supply

The connection to an AT power supply is as simple as connecting a 4P power connector to CN1. Power on or off is controlled by the power switch on the AT power supply. Let the jumper caps stay on JP2.

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Appendix
C
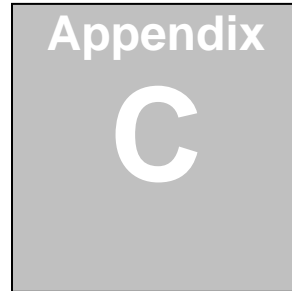
ALi® RAID for SATA

1.1.1 1. Introduction

The ALi M5283 is a highly integrated disk drive controller that is capable of managing Parallel-ATA and Serial-ATA interface hard disk drives. The ALi controller supports PATA UDMA transfer mode up to mode 6 and SATA 1.0 disk drives. The ALi M5283 also comes with cost-effective RAID functionalities that can be used to increase data read/write speed and to provide protection to data by distributing mirrored duplicates of data onto two disk drives (RAID1).

⚠️ CAUTION!

You must properly configure the associated BIOS settings before the Ctlr+A key combination can take effect. Please refer to **Chapter 4 Award BIOS Setup,** the discussions of the associated configurations for more details. SATA disk drive support must be initiated under the following two BIOS sub-menus.

1. **Boot -> Onboard SATA ROM**
2. **Chipset -> Southbridge Chipset Configuration**

You will not be able to access the ALi configuration utility unless you have properly initiated the SATA disk drive support in the Award BIOS configuration utility.

⚠️ CAUTION!

A configured RAID volume (which may consist of multiple hard drives) appears to an operating system as a contiguous storage space. Your operating system will not be able to distinguish the physical disk drives contained in a RAID configuration.

1.1.2 Precautions:

1. One key benefit a RAID configuration brings you is that a single hard drive can fail within a RAID array without damaging your data. With RAID1 array, you can replace a failed drive and restore your RAID configuration.

    However, if you replace the wrong drive when you are trying to remove a failed one,

    irrecoverable data loss will occur! It is therefore strongly recommended to mark the

    physical connections of all of your SATA disk drives. If a drive member of a RAID

    array should fail, you will then be able to correctly locate a failed drive.
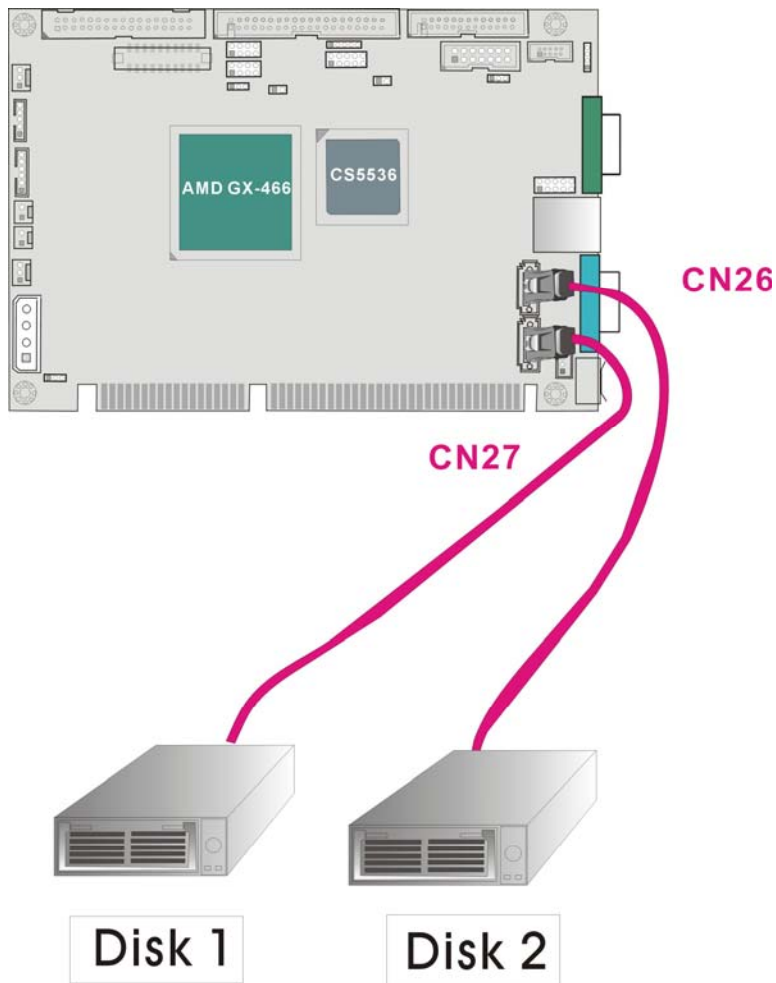
For example, you may specify the drive locations by attaching stickers to the drive

bays. You need a reminder if the cabling does not match the physical locations of

hard drives.

2. It is also crucial that you do not accidentally disconnect the SATA drive cables. Carefully route your cables within the chassis to avoid system down time.

1.1.3 2. Features and Benefits

- Supports RAID levels 0, 1, and JBOD.
- Supports the connectivity to two disk drives.
- The supported Operating Systems include: Windows XP, Windows XP Embedded and Windows CE.
- Windows-based software for RAID management.

3. SATA-ALi RAID Driver

⚠️ **CAUTION!**

> Because of the inherent limitations by system chipset, the ALi M5283 SATA and RAID controller is implemented as a device that requires you to provide device driver during the Windows installation process. To successfully install the device driver, please carefully read the following instructions.

The ALi driver is especially required if SATA drives are the only hard disk drives in your system. Otherwise the Windows installation program may fail to locate your hard drives whether you configure your SATA disk drives into RAID volumes or use them as individual disk drives.

The system BIOS can identify SATA disk drives, but cannot control their operation. The separately installed driver therefore is necessary.

ALi SATA Controller Driver Installation Steps

- During Windows XP Installation

Step 1.   Enable SATA ROM using the BIOS configuration utility. The SATA ROM option is provided in the ALi BIOS menu.

Step 2.   Locate the ALi installation driver folder within the Utility CD that came with your motherboard.

Step 3.   Copy files under a sub-directory named "SATA50XX" (taking Windows XP installation as the example) to the root directory of floppy diskette (labeled driver diskette). The file names are listed below:
- disk1
- 5283096D.bin
- txtsetup.oem

Also copy the OS option directory and related driver files in each directory.

Step 4.   Boot from Windows installation CD-ROM (this requires you to set CD-ROM as the 1st Boot Device), when the Windows XP Setup blue screen appears and prompts users to Press F6 if you need to install third-party SCSI or RAID driver, please press the F6 key.

Step 5.   The setup program will continue, later when the setup program prompts users to specify additional adapters, please press the S key.

Step 6.   Then the setup program will prompt user to insert the driver diskette. Please insert the driver diskette your prepared previously, and then press ENTER to continue.

Step 7.   The follow-up window will list out the installation choices, please select ALi SATA/RAID Controller for Windows XP and press ENTER to continue.

Step 8.   The follow-up window will list out the devices to be installed, in which selected ALi controller(s) should be included.

Step 9.   Repeat **step 5**, but select ALi ATA/RAID Controller at **step 7**. If both controllers are installed, go to next step.

Step 10.   If users want to install other devices, please operate at this time. If all devices have been successfully installed, please go to next step.

Step 11.   Press Enter to continue Windows XP setup.

Installation Steps under Existing Windows XP

After Windows XP is started, Windows system will automatically find the newly installed adapter and prompt user to install its driver. Please follow these steps to install the driver:

Step1.   When the Found New Hardware Wizard windows appear (Mass Storage Controller), select Install from a list or specify location (Advanced) and click Next to continue.

Step 2.   In the follow-up window, please select "Don't search, I will choose the driver to install", then click Next to continue.

Step 3.   In the follow-up window, please select SCSI and RAID controllers, and then click Next to continue.

Step 4.   In the follow-up window, click Have Disk..., then insert the driver diskette and type in the driver location: e.g., a CD-ROM, then click OK to continue.

Step 5.   In the follow-up window, select ALi SATA/RAID Controller, then click Next to continue.

Step 6.   Confirm the follow-up windows and click the Finish button to continue.

Step 7.   Please "confirm" the Digital Signature Not Found window when it appears, when finished, please restart the computer.

Step 8.   Repeat step 1, but select ALi ATA/RAID Controller at step 4.

1.1.4

1.1.5 4. Accessing the ALi RAID Utility

If the SATA ROM configuration options in system BIOS have been properly configured, the RAID BIOS version and disk drive information should appear after system POST screen.

The BIOS disk drive information should look like the following:

ALi RAID BIOS V1.XX
(c) ALi Corporation 2005, All Rights Reserved.
Identifying IDE drives…

Channel 1 Master: Maxtor xxxxxx
Channel 2 Master: Maxtor xxxxxx

Press Ctrl-A to enter ALi RAID BIOS setup utility

To enter the RAID configuration utility, press 'Ctrl' and 'A' keys simultaneously.
1.   RAID BIOS Setup Menu:

The Serial ATA RAID volume may be configured using the RAID Configuration utility stored within the ALi RAID controller ROM. The BIOS configuration screen is divided into three major functional areas: Main Functional Menu, Drive Selection Menu, and a list for the configured RAID arrays.

---

2. RAID Options:

2.1 Create RAID0 Striping for Performance

Step 1. To create a RAID0 array, use your arrow keys to highlight and press Enter to activate this item. An 'S' flashing character will appear at the Drive Selection Menu where you can choose the member drives to be included in the RAID0 array.

Step 2. Use the Space key to select members of the RAID0 RAID configuration. The flashing cursor should change to a lower case 's' character once any of the connected disk drives has been selected. Follow the same method to select another member drive.

Step 3. You should then be prompted by a "Create RAID0(Y/N)" confirm box.

Step 4. Press Y and then some necessary information will be written to the selected disk drives.


⚠ WARNING!

All data previously stored on the member drives of a RAID configuration will be destroyed during the RAID initialization process. If you use "used" drives to create a RAID array, make sure you have moved or backed up your data before creating a RAID array out of these disk drives.

Step 5. Next you will be prompted to enter a nickname for the created array. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for naming an array.

Step 6. Once an array is successfully created, it will be listed in the list of the configured arrays.

NOTE:

1. To reduce the chance of losing data, ALi imposed certain limitations on the RAID configuration options. For example, Parallel-ATA drives connected on the same IDE channel cannot be selected as the members of a RAID0 array. Mixing Parallel- and Serial-ATA disk drives in a RAID0 array should also be avoided.

2. Always use disk drives of the same capacity to create a RAID array. The excessive capacity of a larger disk drive cannot be utilized because data stripes are equally distributed across all members of a RAID array. The operational concept is diagrammed below.
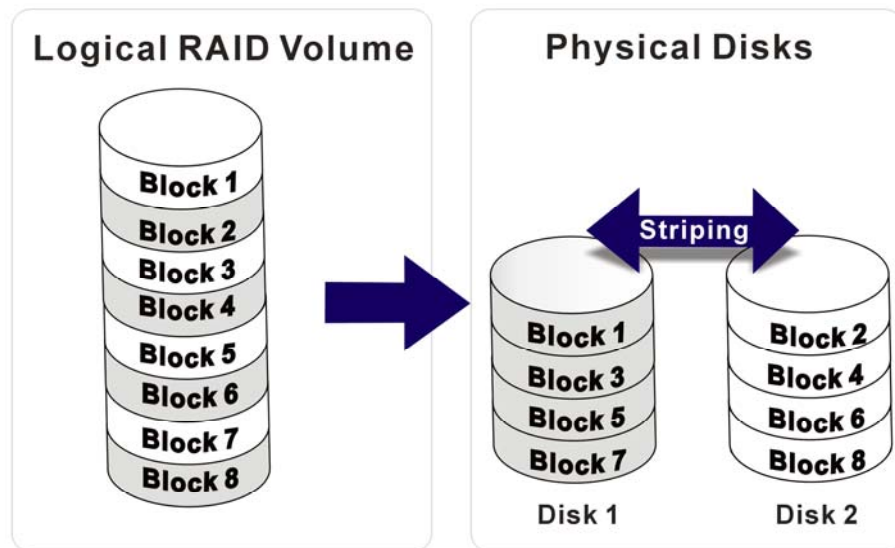
2.2   Create RAID1 Mirroring for Reliability

Step 1.   To create a RAID1 array, use your arrow keys to highlight and press Enter to activate this item. An 'M' flashing character will appear at the Drive Selection Menu where you can choose the member drives to be included in the RAID1 array.

Step 2.   Use the Space key to select members of the RAID1 RAID configuration. The flashing cursor should change to a lower case 'm' character once any of the connected disk drives has been selected. Follow the same method to select another member drive.

Step 3.   You should then be prompted by a "Create RAID1(Y/N)" confirm box.

Step 4.   Press Y and then some necessary information will be written to the selected disk drives.

⚠ WARNING!

All data previously stored on the member drives of a RAID configuration will be destroyed during the RAID initialization process. If you use "used" drives to create a RAID array, make you have moved or backed up your data before creating a RAID array out of these disk drives.

Step 5.   Next you will be prompted to provide a nickname for the created array. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for naming an array.

Step 6.   Once an array is successfully created, it will be listed in the list of the configured arrays.

Step 7.   Lastly a prompt will require you to proceed with drive copy. The Source and Destination drives will be indicated as "M" and "m" in the Drive Selection Menu.

NOTE:

1. To reduce the chance of losing data, ALi imposed limitations on the RAID configuration options. For example, Parallel-ATA drives connected on the same IDE channel cannot be selected as the members of a RAID1 array. Mixing Parallel- and Serial-ATA disk drives in a RAID1 array should also be avoided.

2. Always use disk drives of the same capacity to create a RAID array. The excessive capacity of a larger disk drive cannot be utilized because data mirrors are equally distributed across corresponding members of drive pairs within a RAID array. The operational concept is diagrammed below.
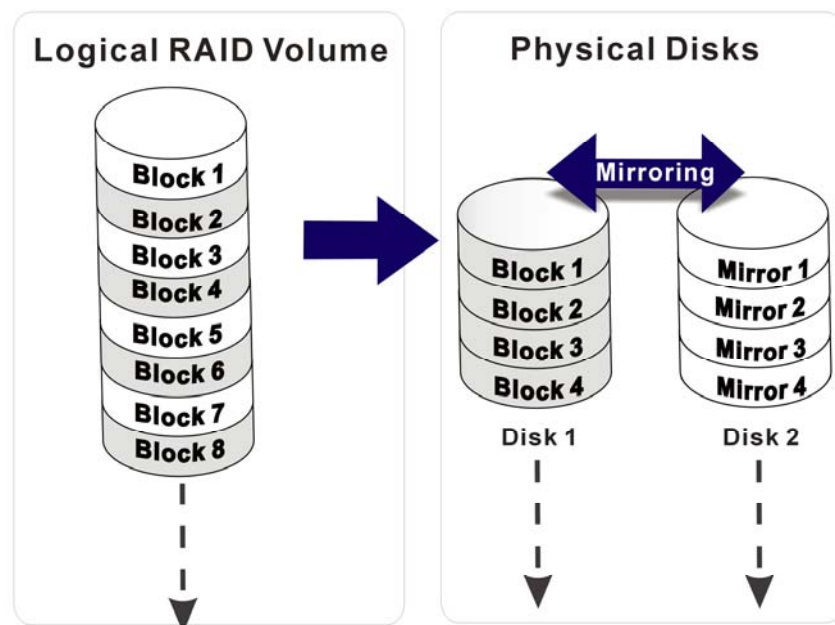
2.3 Create JBOD for Integrated Capacity

Step 1.   JBOD stands for "Just a Bunch of Drives." JBOD provides neither performance gains nor data redundancy. To create a JBOD array, use your arrow keys to highlight and press Enter to activate this item. A 'J' flashing character will appear at the Drive Selection Menu where you can choose the member drives to be included in the JBOD.

Step 2.   Use the Space key to select members of the JBOD configuration. The flashing cursor should change to a lower case 'j' character once any of the connected disk drives has been selected. Follow the same method to select another member drive. The maximum number of member drives in a JBOD is four and the minimum is two.

Step 3.   You should then be prompted by a "Create RAID1(Y/N)" confirm box.

Step 4.   Press Y and then some necessary information will be written to the selected disk drives.

WARNING!

> All data previously stored on the member drives of a RAID configuration will be destroyed during the RAID initialization process. If you use "used" drives to create a RAID array, make you have moved or backed up your data before creating a RAID array out of these disk drives.

Step 5. Next you will be prompted to provide a nickname for the created array. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for naming an array.

Step 6. Once an array is successfully created, it will be listed in the list of the configured arrays.

NOTE:

> To reduce the chance of losing data, ALi imposed limitations on the RAID configuration options. For example, Parallel-ATA drives connected on the same IDE channel cannot be selected as the members of a RAID1 array. Mixing Parallel- and Serial-ATA disk drives in a RAID1 array should also be avoided.

2.4   Stripe Size

The change to stripe size takes effect on RAID0 arrays. Configurable options are: 64K (default), 32K, 16K, 8K, and 4K. If you can be certain that your I/Os to the hard drives are small and randomly occurred, you can select a small stripe size. If your I/Os are mostly large and come in sequential orders, e.g., A/V playback and editing applications, choose a larger stripe size.

The default value, 64K, should be appropriate for most applications.

2.5   Delete RAID Setting & Partition

Step 1. To delete an existing RAID configuration, use your arrow keys to highlight and press Enter to activate this item. An 'E' flashing character will appear at the Drive Selection Menu where you can choose the member drives to be removed from an existing configuration.

Step 2. You should then be prompted by "Data on RAID drives will be erased (Y/N)?"

Step 3. Press Y and then the RAID configuration will be invalidated.

WARNING!

> If you delete a RAID configuration, all data previously stored on the member drives of the RAID configuration will be destroyed.

2.6   Delete All RAID Setting & Partition

Step 1. To delete all existing RAID configurations, use your arrow keys to highlight and press Enter to activate this item.

Step 2. You should then be prompted by "Data on RAID drives will be erased (Y/N)?"

Step 3. Press Y and then all existing RAID configurations will be invalidated.

⚠️ **WARNING!**

If you delete a RAID configuration, all data previously stored on the member drives of the RAID configuration will be destroyed.

2.7 Rebuild RAID Array

This function allows you to rebuild a RAID array if a member of a RAID configuration should fail. Neither RAID0 nor JBOD provides data redundancy. Therefore, this option only applies to RAID1 arrays. This item takes effect when a member of a RAID1 configuration has failed.

Step 1. To delete all existing RAID configurations, use your arrow keys to highlight and press Enter to activate this item.

Step 2. An "R" flashing character should appear at the list of existing arrays.

Step 3. The source and destination drives will be displayed.

Step 4. Press Y to begin the rebuild process.

Step 5. During the rebuild process, the rebuild progress will be indicated by a status bar. Rebuild consumes considerable system resources and the time required for rebuilding a RAID array may vary depending on the size of stored data, disk drive capacity, and drive performance.

2.8 Select Boot Drive

Step 1. To select a Boot drive, use your arrow keys to highlight and press Enter to activate this item.

Step 2. An "A" flashing character should appear at the Drive Selection Menu.

Step 3. Press Enter or the Space key to finish the configuration.

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Product Service

Diagnosis and Debug

CyberResearch, Inc. maintains technical support lines staffed by experienced Applications Engineers and Technicians. There is no charge to call and we will return your call promptly if it is received while our lines are busy. Most problems encountered with data acquisition products can be solved over the phone. Signal connections and programming are the two most common sources of difficulty. CyberResearch support personnel can help you solve these problems, especially if you are prepared for the call.

To ensure your call's overall success and expediency:

1)   Have the phone close to the PC so you can conveniently and quickly take action that the Applications Engineer might suggest.
2)   Be prepared to open your PC, remove boards, report back-switch or jumper settings, and possibly change settings before reinstalling the modules.
3)   Have a volt meter handy to take measurements of the signals you are trying to measure as well as the signals on the board, module, or power supply.
4)   Isolate problem areas that are not working as you expected.
5)   Have the source code to the program you are having trouble with available so that preceding and prerequisite modes can be referenced and discussed.
6)   Have the manual at hand. Also have the product's utility disks and any other relevant disks nearby so programs and version numbers can be checked.

Preparation will facilitate the diagnosis procedure, save you time, and avoid repeated calls. Here are a few preliminary actions you can take before you call which may solve some of the more common problems:

1)   Check the PC-bus power and any power supply signals.
2)   Check the voltage level of the signal between SIGNAL HIGH and SIGNAL LOW, or SIGNAL+ and SIGNAL– . It CANNOT exceed the full scale range of the board.
3)   Check the other boards in your PC or modules on the network for address and interrupt conflicts.
4)   Refer to the example programs as a baseline for comparing code.

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Warranty Notice

CyberResearch, Inc. warrants that this equipment as furnished will be free from defects in material and workmanship for a period of one year from the confirmed date of purchase by the original buyer and that upon written notice of any such defect, CyberResearch, Inc. will, at its option, repair or replace the defective item under the terms of this warranty, subject to the provisions and specific exclusions listed herein.

This warranty shall not apply to equipment that has been previously repaired or altered outside our plant in any way which may, in the judgment of the manufacturer, affect its reliability. Nor will it apply if the equipment has been used in a manner exceeding or inconsistent with its specifications or if the serial number has been removed.

CyberResearch, Inc. does not assume any liability for consequential damages as a result from our products uses, and in any event our liability shall not exceed the original selling price of the equipment.

The equipment warranty shall constitute the sole and exclusive remedy of any Buyer of Seller equipment and the sole and exclusive liability of the Seller, its successors or assigns, in connection with equipment purchased and in lieu of all other warranties expressed implied or statutory, including, but not limited to, any implied warranty of merchant ability or fitness and all other obligations or liabilities of seller, its successors or assigns.

The equipment must be returned postage prepaid. Package it securely and insure it. You will be charged for parts and labor if the warranty period has expired.

Returns and RMAs
If a CyberResearch product has been diagnosed as being non-functional, is visibly damaged, or must be returned for any other reason, please call for an assigned RMA number. The RMA number is a key piece of information that lets us track and process returned merchandise with the fastest possible turnaround time.

<div align="center">

PLEASE CALL FOR AN RMA NUMBER!

Packages returned without an RMA number will be refused!

</div>

In most cases, a returned package will be refused at the receiving dock if its contents are not known. The RMA number allows us to reference the history of returned products and determine if they are meeting your application's requirements. When you call customer service for your RMA number, you will be asked to provide information about the product you are returning, your address, and a contact person at your organization.

<div align="center">

***Please make sure that the RMA number is prominently
displayed on the outside of the box.***

• Thank You •

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